THE PUBLIC'S HABITAT PREFERENCES: AN ANALYSIS

FINAL SUMMARY REPORT OF THE CROSS-HABITAT STUDY FOCUS GROUPS

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1. BACKGROUND

Several statutes under which NOAA's Damage Assessment Center operates, including the Comprehensive Environmental Response, Compensation and Liability Act (more commonly known as Superfund), the Oil Pollution Act, and the National Marine Sanctuaries Act, call on designated official Trustees to assess and recover damages on behalf of the public[1] for trust natural resources injured as the result of a discharge of oil, a release of a hazardous substance, or physical injury.

Under these statutes, Trustees may seek compensatory restoration to compensate for interim losses of natural resources and services, pending their recovery to baseline conditions. Trustees first consider compensatory restoration that provides services of the same type, quality, and of comparable value as those injured (e.g. replacing lost salt marsh services with created salt marsh habitat). If Trustees cannot identify compensatory projects that provide natural resource services of the same type, quality, and comparable value, they attempt to identify actions that provide natural resource services of *comparable* type and quality as those provided by the injured natural resources.[2]

To determine the appropriate scale of compensatory restoration actions in instances where Trustees are proposing the use of natural resource services of a *comparable* type and quality, Trustees have used scientific evidence to equate different habitat types. Scientific conversion factors are currently used when scaling the amount of habitat lost due to the injury to the amount of habitat gained by the replacement project. However, public preferences for habitats have typically not been explicitly considered in the scaling, even though the public is not being compensated with the same habitat that was lost. Scientific conversion factors may not be consistent with public preferences for restoration. Although scientists may agree on a conversion ratio, the public may desire a lesser or greater amount of one habitat to compensate for injury to another. Additionally, some members of the public are skeptical of scientific estimates in the damage assessment context, as they fear the estimates may be biased in some way. The cross-habitat study attempts to determine how the conversion factors currently used in damage assessment compare with public preferences through an examination of the public's preferences regarding various habitats and the services they provide. The overarching goal of the study is to provide valuable information to damage assessors and natural resource managers on the relative importance and value of different habitats from the public's perspective. However, it is unknown at this stage how this additional information would be used in the applied damage assessment context.

Furthermore, public policy analysis often calls for public input into management decisions regarding natural resources. If these decisions are challenged, or as more management actions are taken to protect and restore habitats, conflicts between numerous user groups may occur. It is necessary for resource managers to have strong justifications

[1] Penn, Tony. *A Summary of the Natural Resource Damage Assessment Regulations Under the United States Oil Pollution Act. NOAA.*

[2] Ibid.

to support such decisions. Therefore, the first objective of the cross-habitat initiative is to design a study that will determine the estimated values or tradeoff ratios that the public places on various habitats and their services in a particular geographical region. This information will be useful for a variety of management scenarios beyond damage assessment, including the establishment of permits, entry fees or wilderness designation.

The second objective is to establish a survey protocol that could be used in future Natural Resource Damage Assessment (NRDA) cases. The cross-habitat study was initiated in the Chesapeake Bay Region because the research team is located in Silver Spring, MD. If the study proceeds with the development of a full survey administered in a particular region, such as the Chesapeake Bay, the applicability of the results may be limited to that region, as the habitat characteristics and cultural preferences may vary on a regional basis. However, if it is determined that the same type of information would be useful for a specific damage assessment in another region, the same survey process could be replicated, thereby significantly reducing time and cost.

The purpose of this report is to 1) describe the focus group process, 2) discuss the habitat service ranking data, 3) review the choice-based scenario results, 4) summarize lessons learned from the eight focus groups, and 5) outline the next steps for the project. A chapter is devoted to each of these five topics. The report contains all the data collected from the focus groups. For this reason, it contains a number of figures and tables, some of which are quite complex. Where appropriate, both the detailed data and summaries are provided. With the exception of complete copies of the focus group handouts, this report has been designed to be a stand-alone description of the cross habitat project.

2. FOCUS GROUPS

Eight focus groups were held the Chesapeake Bay Region:

1. Rockville, MD (two in May 2004 and two in September 2004),
2. Virginia Beach, VA (two in June 2004) and
3. Wilmington, DE (two in July 2004).

Locations were selected with the goal of getting a cross-sectional representation of the Chesapeake Bay region. At each location, two focus groups were held on the same night, at 5:30 and 8:00 PM, to accommodate the varied schedules of participants. The research team took turns moderating the focus groups. Market research firms provided the facility and solicited the participants.

The market research firms used their individual selection mechanisms to assemble groups that were approximately half male and half female. Roughly fifty percent of the groups' participants were between the ages of 21 and 44, and the other fifty percent were 45 years of age or older. Participants had not been involved with more than two focus groups of any kind in the past, and had lived in the respective area (Wilmington, DE; Rockville, MD; or Virginia Beach, VA) for at least four years. Although a potential mail survey might include respondents who had been in the Chesapeake Bay region for only a short time, the project team felt it was important to obtain information from long-term residents that were familiar with the Chesapeake Bay region for the development of the survey instrument. This enabled the team to determine whether the habitat and scenario descriptions made sense and were believable to people that had lived in the area long-term, as the same habitat type can differ on a regional basis. However, a formal survey would poll a random sample of people in the region, including those that had recently moved to the area.

Each focus group lasted about two hours. A moderator led the groups, which were video and/or audio taped. Upon arrival, participants were asked to fill out a form about their environmental affiliations and recreational activities, similar to the introductory questions often asked in a mail survey (see Appendix I). The purpose of this form was to analyze how participants' activities and associations might influence their decisions.

The rest of the focus group sessions alternated between the participants completing two sets of handouts (one on their preferences for specific habitat services and one on their habitat preferences in general) and group discussion. Each set of handouts was completed before the discussion to avoid as much response bias as possible and to test questions that might be included in a mail survey.

The group discussions consisted of the moderator asking a question of one participant, or asking open-ended questions, which often generated a larger discussion. Participants were told before starting that there was no wrong answer, differences of opinion were expected, and nothing they said would be attributed to them at a later date (see Appendix II for specific instructions given to focus group participants).

3. HABITAT SERVICE PREFERENCES

As previously stated, the goal of the cross-habitat study is to examine the public's preferences among different habitats and the services they provide. The project team wanted to examine the public's preferences regarding habitat services, because when an injured habitat cannot be replaced with the same habitat type, scientists often decide which similar habitat to replace it with based on the services each habitat provides and how similar they are to those of the injured habitat. The replacement habitat must be able to perform the critical functions of the injured habitat, although the quantity and quality of these services may be different, something that should be accounted for in the replacement ratio.

Therefore, the research group initially felt it was important to give focus group participants information about each habitat as well as the critical services it provides, before asking them to state their preferences for these habitats and services. In the first set of handouts, a brief description of each habitat (the types of habitat differed somewhat by focus group; see Table 3.1) was provided, giving respondents just enough information to picture the habitat based on their previous experiences, but not enough to bias toward one habitat or another those participants unfamiliar with the habitats. For example, the description for sediments was:

> "Sediments are really a diverse collection of different size particles (sand, gravel, mud) deposited on the bottoms of rivers, lakes and marine waters (they are not particles suspended in the water column)."

Subsequently, several services were described for each habitat. The following is a description of one of the marsh services provided:

> "Estuarine marshes provide certain species of fish and wildlife that can be harvested for commercial use."

Table 3.1: Habitats Addressed in Each Focus Group

Habitat	Rockville #1	VA Beach	Wilmington	Rockville #2
Marsh	X	X	X	X
SAV		X	X	X
Sediment	X	X	X	X
Beach	X			
Oyster Reef			X	X

The economists involved in this study sought the aid of several biologists in writing these habitat and service descriptions. The number of services per habitat was limited, so as not to overload the participants with information or give the impression that one habitat was more important than another.

Participants were asked to read the information provided about each habitat and then circle whether each service was very important, somewhat important, or not important at all to them. They were then asked to rank the services in order of the service's importance to them (for example, "1" being highest, "4" being lowest). See Appendix III for an example of this type of handout. This ranking was followed by a group discussion about responses.

The purpose of this portion of the focus group sessions was to determine whether respondents can define their preferences for different habitat services, and whether their service preferences are sensitive to the amount of information provided. The research team decided that if participants could define their service preferences given the information provided, then the habitat descriptions were sufficient for the solicitation of habitat preferences that occurs later in the survey.

Stated preference surveys are one of the best methods available to determine public preferences, but they have limitations. By providing even limited information about each habitat and its services, the research team may be biasing the participants, as the information selected for presentation to the respondents and the way it is presented can influence a participant. Therefore, the research team tried to give participants just enough factual and neutral information for them to recognize the habitat, but not enough to severely bias them. The purpose of the study is to solicit from these participants their habitat preferences given what they already know about the habitats. Therefore, although some habitats provide similar services in different qualities and quantities, this differentiation is not expounded upon in the survey materials.

3.1 Rockville Focus Groups #1

Our first set of focus groups in Rockville, MD, discussed estuarine marsh, sediment, and ocean beach habitats. Each focus group had nine participants.

***Marsh*:** Marsh services included improved water quality (which received a transformed mean ranking of 3.71), provision of habitat for wildlife (2.79), wildlife for commercial harvest (2.14), and recreational opportunities (1.36) (see Figure 3.1). These transformed mean rankings were obtained by averaging the rankings from both focus groups for each service ("1" being most important and "4" being least important) and then transforming them so that "4" (or however many services are ranked for that habitat) is the most important service on the scale, and "1" the least important. The higher the transformed mean ranking, the more important the service was to the focus group participants overall.

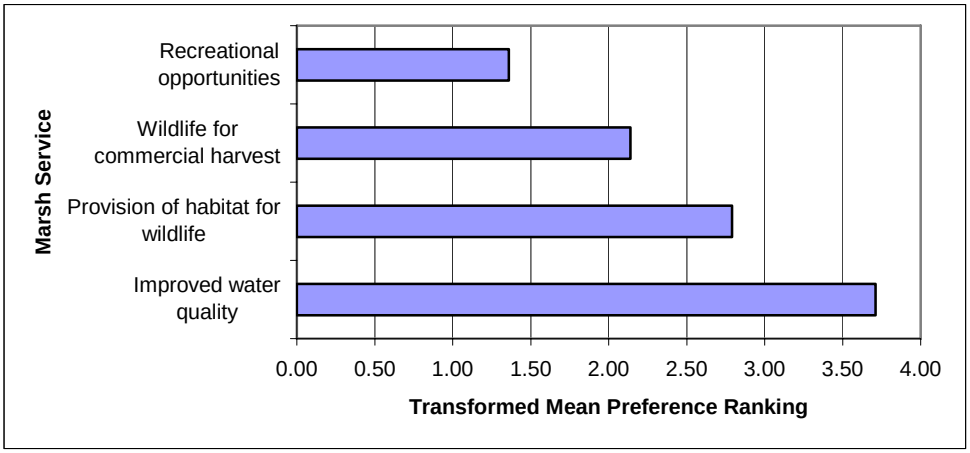

Figure 3.1: Marsh Service Preferences, Rockville #1

Water quality was by far the most highly ranked service, receiving eleven "4"s out of fourteen valid responses (the rankings of four respondents were eliminated from the analysis because they gave the same ranking to more than one service). This service may have been highly ranked because participants thought that the water quality provided by a marsh impacted the quality of their drinking water, which they believed to be essential to their health (see Figure 3.4 in Rockville #1 discussion section). Additionally, these focus groups were conducted around the time that unsafe drinking water was making headlines in the Washington, D.C. metropolitan area.

It was somewhat surprising that participants ranked recreational opportunities and wildlife for commercial harvest the lowest, as those are the two services which humans directly enjoy. Wildlife for commercial harvest received five "3" rankings, while recreational opportunities received none (see Figure 3.4). However, people in the Rockville area may not associate wetlands with recreation, and several people in the group did not regularly include fish in their diets.

***Sediment*:** Sediment services included provision of habitat for wildlife (2.21), structure for plants (2.00), and food for higher-level animals (1.79) (see Figure 3.2).

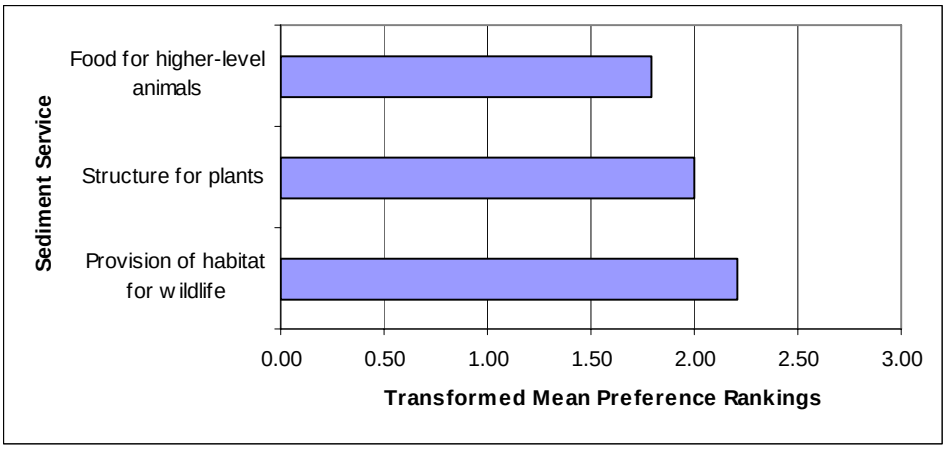

Figure 3.2: Sediment Service Preferences, Rockville #1

The mean rankings were around a "2" for all services; collectively, respondents did not make the same distinctions between sediment services as they did with marsh services. The provision of habitat for wildlife received five "3" rankings and seven "2" rankings; structure for plants was almost evenly split between six "3" rankings and six "1" rankings; and food for higher-level animals received three "3" rankings, five "2" rankings and six "1" rankings (see Figure 3.4). It could be that food for higher-level animals was ranked the lowest because it is an indirect service resulting from sediment's support of lower-level animals.

***Ocean Beaches*:** Ocean beach services included the storm protection of shoreline property and coastal marshes (3.00), habitat for wildlife (2.64), recreational opportunities (2.36), and a nesting ground for turtles and birds (2.14) (see Figure 3.3).

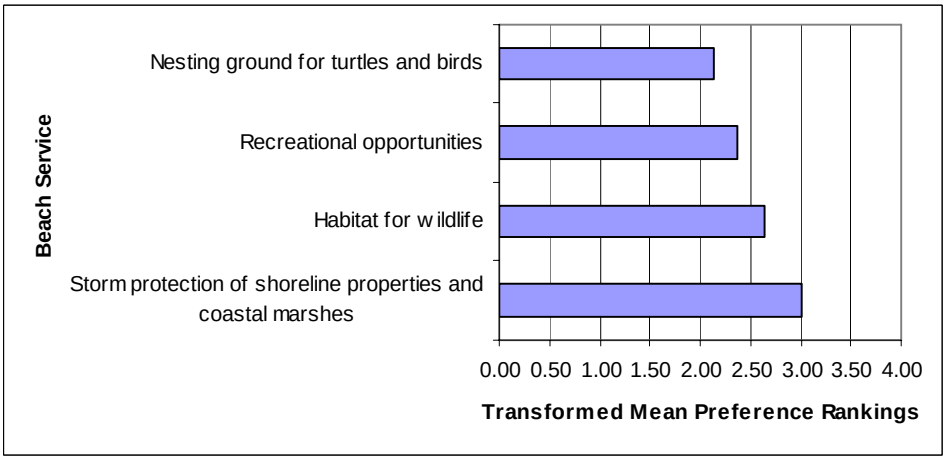

Figure 3.3: Ocean Beach Service Preferences, Rockville #1

It was not surprising that storm protection of property was ranked the highest (it received seven "4" rankings), as this service directly affects humans, although, in the discussion following the ranking, people said they felt that property protection and coastal marsh

protection were two separate services. Others argued that storm protection only affected the very wealthy that have houses on the beach, and that because of development and erosion, this service was not applicable to most of the developed areas in the Chesapeake Bay area.

It was surprising, however, that recreational opportunities was ranked as low as it was (it received only three "4" rankings, four "3" rankings, two "2" rankings, and five "1" rankings) (see Figure 3.4) as many participants indicated that they enjoyed going to the beach. Several of these participants said that because of the plethora of beaches in the area, the recreational services of beaches were not as important as the ecological services.

Finally, a nesting ground for turtles and birds may have ranked lowest (it received three "4" rankings, five "2" rankings and five "1" rankings) because a number of people said they had never seen a bird nesting on a dune (see Figure 3.4). Again, because the study is soliciting people's preferences given what they already know about the habitat, some people's preferences may be undefined for certain services.

***Discussion*:** Overall, participants said they found it much easier to state how important a service was to them than to rank the services, because the rankings required them to make more distinctions between services. The handout did not give participants the option to rank two services equally, and perhaps forced preference differentiation that might not have actually existed. In fact, several participants said they gave some services different rankings even though they were indifferent between them, because they were told to give each service a different ranking. However, when pressed, most admitted that their most highly ranked service was indeed slightly more important to them, even if the difference between that service and others was very slight. A formal survey would not ask people to rank services. The research team included the ranking task in the focus groups to determine if the descriptions were adequate enough to allow those who had defined preferences to distinguish between them. As previously stated, there was also the issue of four participants in these focus groups that gave the same number ranking (for example, a "4" or "3") to two or three services in each habitat. Their responses were omitted from this analysis.

It was also interesting to note the different value systems, or "strategies", that participants used to rank the services. Participants were told to rank the services according to their own preferences, but this meant something different to each participant. Some made their rankings based on direct service provision (i.e. those services that involved direct human benefit). Others said they ranked the services based on the "building block" approach; if one service cannot occur without another service, then the supporting service is more important. For example, the provision of certain species of fish and wildlife for commercial use by marshes cannot occur without high water quality, and thus high water quality is the more important of the two services. Still others insisted that because a habitat is a system, and each service relies on and contributes to other services in some way, it is egregious to rank them independently.

Finally, it was surprising that more participants did not rank higher the services that involve direct human use of the resource for enjoyment or food, such as those involving recreation and commercial use. Instead, participants seemed to primarily prefer the services that affected their own health, such as water quality, followed by those that affect ecological health. Both Rockville #1 focus groups involved impassioned discussions about the over-development of the area and the resulting loss of many habitats. This strong sentiment may have inflated participants' preferences for the ecological services that habitats provide relative to their human use services. Figure 3.4 contains the summary rankings for the Rockville #1 focus groups.

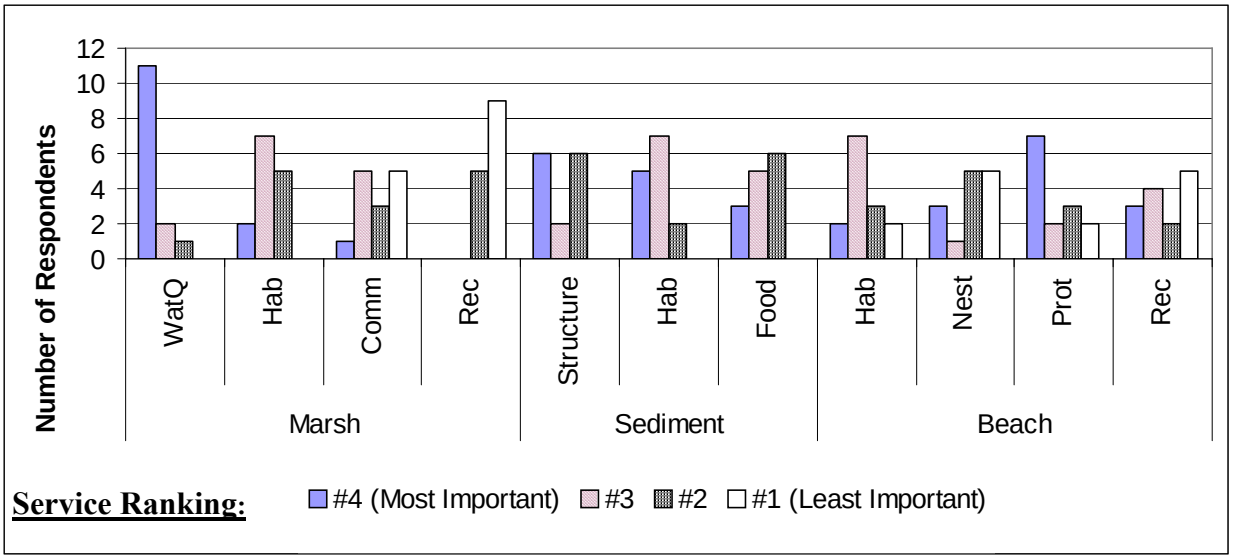

Figure 3.4: Service Ratings for All Habitats, Rockville #1

3.2. Virginia Beach Focus Groups

At the Virginia Beach focus groups, the project team made clear that no two services of the same habitat were to receive the same ranking; however, two participants did rank two or more services equally and their responses were eliminated from this analysis. These focus groups, each involving nine participants, also discussed marsh and sediment, but replaced ocean beaches with submerged aquatic vegetation (SAV). SAV is another habitat that is often injured and provides certain services that can substitute for lost marsh or sediment services. Because ocean beaches are not likely substitutes for the other habitats, they were removed from the survey for the Virginia Beach and all subsequent focus groups.

***Marsh*:** No major changes to the habitat or service descriptions were made from the Rockville focus groups. Participants ranked the services in the following order: improved water quality (3.75), provision of habitat for wildlife (2.75), recreational opportunities (1.87), wildlife for commercial harvest (1.62) (see Figure 3.5).

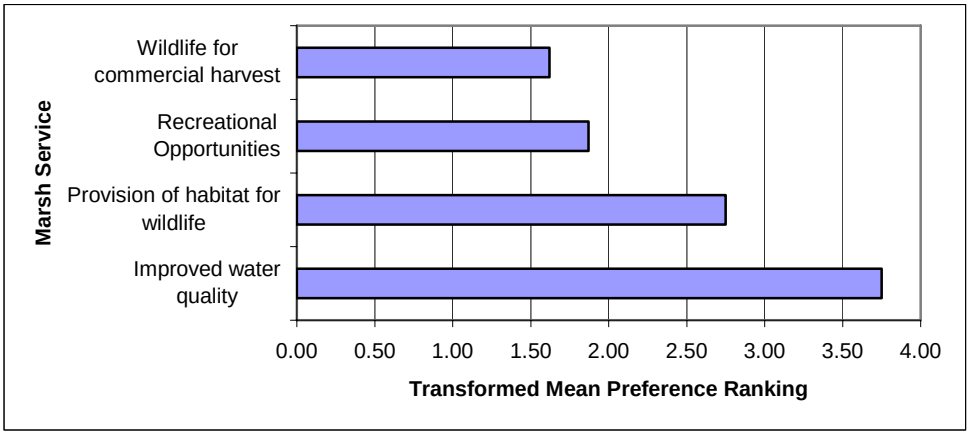

Figure 3.5: Marsh Service Preferences, VA Beach

These rankings and their distributions (see Figure 3.5) are very similar to the Rockville #1 rankings, although recreational opportunities were preferred to wildlife for commercial harvest. Recreational opportunities received two "4" and two "3" rankings, whereas it received zero rankings in these categories in Rockville #1. Wildlife for commercial harvest received zero "4" and "3" rankings, whereas it received one "4" and five "3" rankings in Rockville #1 (see Figure 3.8 in VA Beach discussion section).

Sediment: No changes to the habitat or service descriptions were made from the Rockville #1 focus groups, although clams as a service provided by sediment were removed from the description of the provision of habitat for wildlife service and inserted into the food for higher-level animals service on the handout. Participants ranked the services in the following order: provision of habitat for wildlife (2.19), structure for plants (1.94), food for higher-level animals (1.87) (see Figure 3.6).

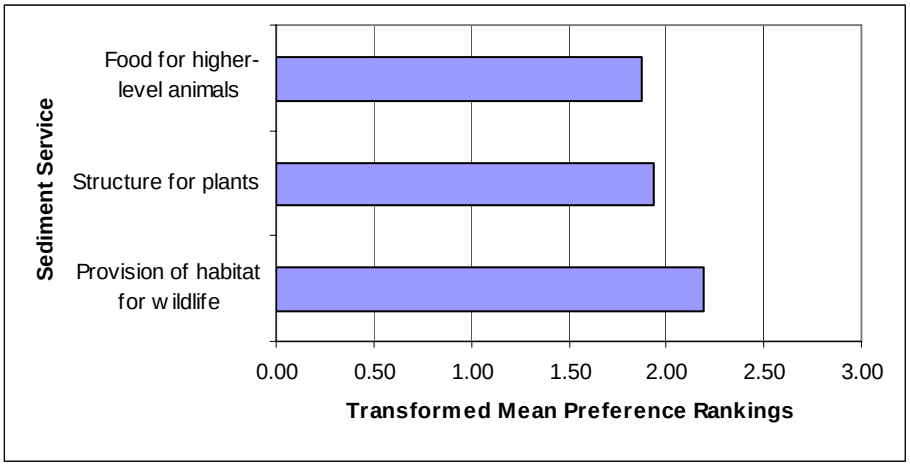

Figure 3.6: Sediment Service Preferences, Virginia Beach

This order is consistent with that of the Rockville #1 focus groups and the averages are quite similar. However, food for higher-level animals was strongly bimodal, with six "3"

rankings and eight "1" rankings, while structure for plants was evenly split with five "3" rankings, five "2" rankings and six "1" rankings (see Figure 3.8).

***SAV*:** SAV services included improved water quality (3.41), improved water clarity (2.65), provision of habitat and food for wildlife (2.53), and recreational opportunities (1.41) (see Figure 3.7).

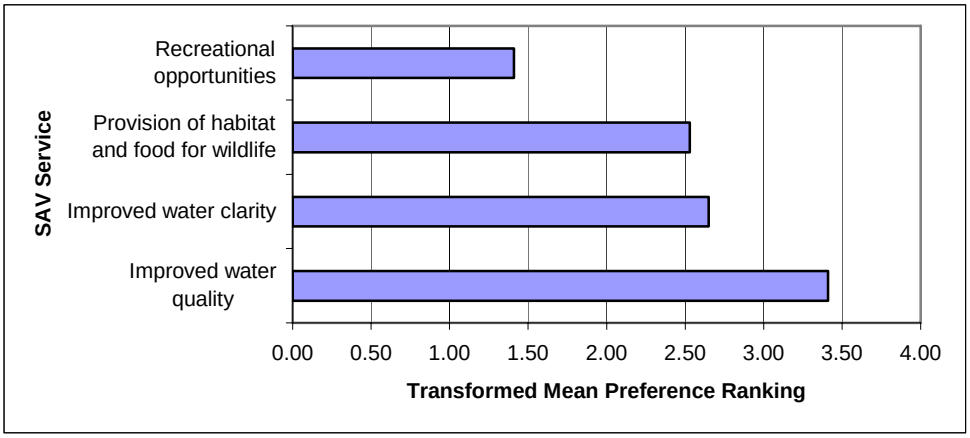

Figure 3.7: SAV Service Preferences, VA Beach

As with the marsh habitat, water quality was ranked as the most important service, receiving nine "4" rankings and seven "3" rankings, possibly because it was associated with drinking water quality. There was some confusion about the difference between water quality and water clarity, yet water clarity only received two "4" rankings and seven "3" rankings (see Figure 3.8). Again, like the marsh service rankings, the recreational opportunities service did not rank highly and several participants noted that they did not normally associate recreation with SAV.

***Discussion*:** Overall, the service rankings were consistent with those of the Rockville #1 focus groups. In Virginia Beach, as in Rockville #1, the heavy development of the area concerned participants and seemed to influence their decisions toward ecological services. Many participants had lived in the Virginia Beach area for over ten years, and had witnessed the gradual loss of many ecosystems for development projects over time. Figure 3.8 contains the summary rankings for the VA Beach focus groups.

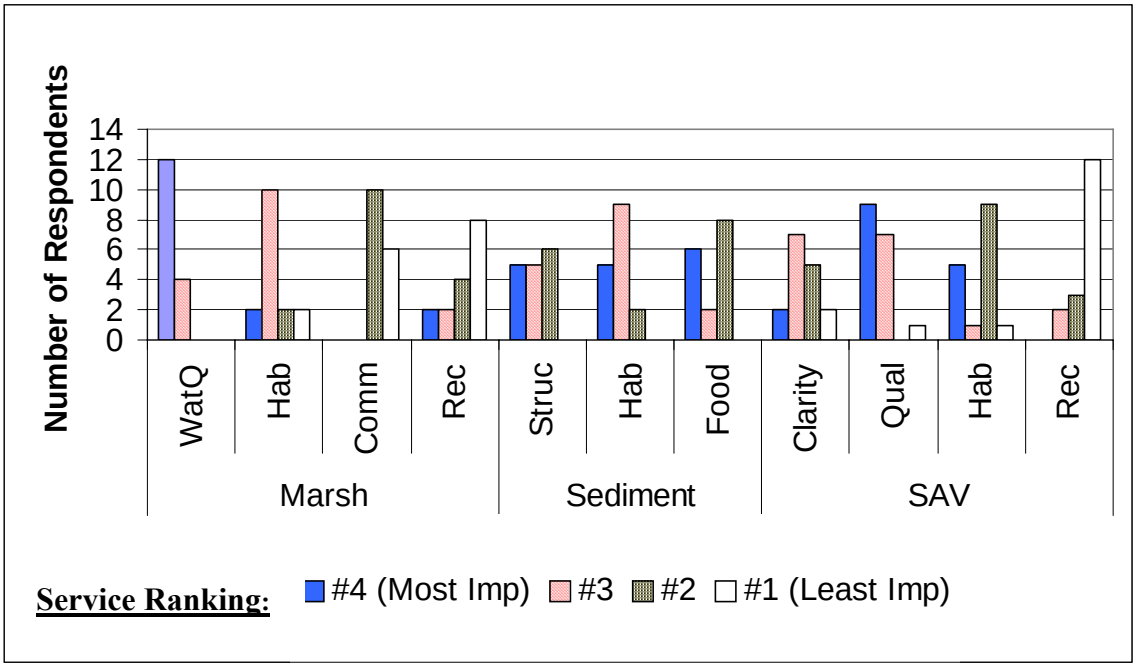

Figure 3.8: Habitat Service Rankings, VA Beach

3.3. Wilmington Focus Groups

The third pair of focus groups were conducted in Wilmington, DE (one contained nine participants, the other eight), and included marsh, sediment, and SAV, but also included a fourth habitat, oyster reefs. Oyster reef was added as an additional habitat that may be of use in a potential mail survey. It was included because it is also a habitat that is frequently injured and can provide services that are partial substitutes for marsh, sediment, and SAV services (see Appendix III for handouts).

***Marsh*:** Unlike in the Rockville #1 and Virginia Beach focus groups, it was made explicit that the water quality service had no impact on drinking water. The rest of the handout was not altered. Participants ranked the services in the following order: provision of habitat for wildlife (3.10), water quality (2.90), wildlife for commercial harvest (2.10), and recreational opportunities (1.90) (see Figure 3.9). One respondent gave a service a "0" ranking, and her responses were eliminated from the marsh habitat analysis.

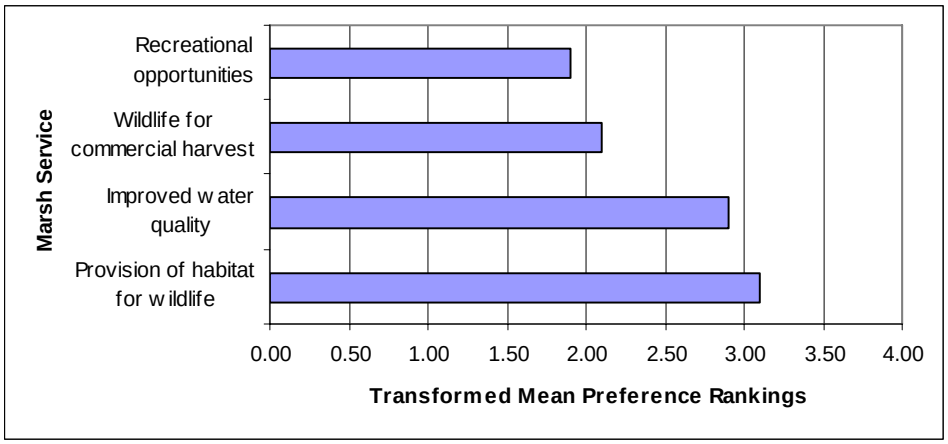

Figure 3.9: Marsh Service Preferences, Wilmington

Water quality was ranked lower than in the last two focus groups, receiving only six "4" rankings and six "3" rankings, most likely because it was not linked to drinking water (see Figure 3.13 in Wilmington discussion section). As a result, the means for the other services were slightly lower than those of the previous focus groups, but reflected similar relationships. However, wildlife for commercial harvest was slightly more highly ranked than recreational opportunities, much like in Rockville, but unlike in Virginia Beach.

***Sediment*:** No major changes were made from the previous two focus groups. Participants ranked the services in the following order: provision of habitat for wildlife (2.86), food for higher-level animals (2.10) and structure for plants (1.30) (see Figure 3.10).

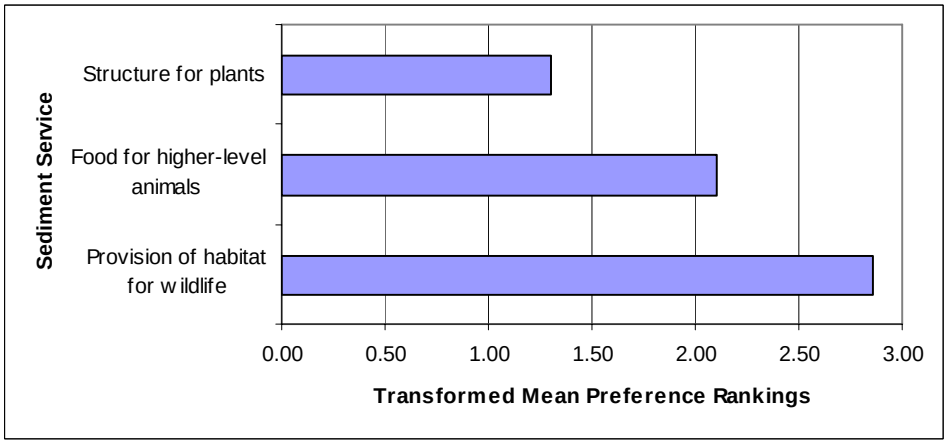

Figure 3.10: Sediment Service Preferences, Wilmington

Surprisingly, the structure for plants service was ranked much lower than in the previous two focus groups, receiving one "3" ranking, four "2" rankings and 13 "1" rankings, whereas its rankings were more evenly split in previous focus groups (see Figure 3.13). This is interesting because, as before, many participants mentioned the foundation, or structure of ecosystem building blocks, as being most important. Provision of habitat for

wildlife also received significantly more "3" rankings (eleven) than it did in previous focus groups (five in both Rockville #1 and Virginia Beach).

***SAV*:** Unlike in the Virginia Beach focus groups, it was made explicit in Wilmington that the water quality service had no impact on drinking water. Recreational opportunities were removed from the service list as this service is only indirectly related to the habitat. Instead, sediment stabilization, another important service provided by SAV, was added. Participants ranked the services in the following order: improved water quality (3.20), provision of habitat and food for wildlife (2.80), water clarity (2.60), and sediment stabilization (1.40) (see Figure 3.11).

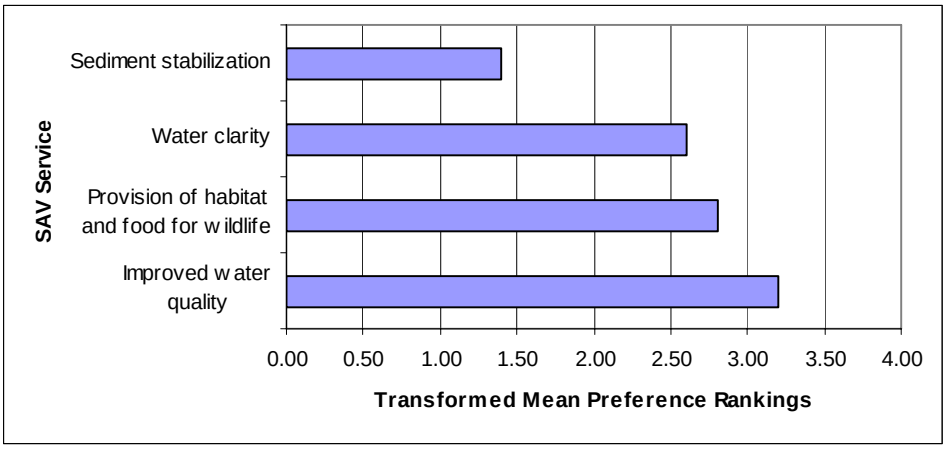

Figure 3.11: SAV Service Preferences, Wilmington

These rankings are fairly similar to those of Virginia Beach, except that the provision of habitat and food for wildlife was ranked slightly above water clarity instead of vice versa. As to be expected, water quality was not ranked as high as before, most likely because it was not linked to drinking water. However, it was still ranked highest, with seven "4" rankings, and seven "3" rankings. Some people asked why water clarity would be important for animals and plants. Yet water clarity still received seven "4" rankings, compared to two "4" rankings in Virginia Beach, although the average rankings were similar in both locations (2.4 in Virginia Beach and 2.4 in Wilmington). Provision of habitat and food for wildlife received less "4" rankings (three) than it did in Virginia Beach (five), but still received a higher overall rating. Most people did not demonstrate an affinity for sediment stabilization: it received only one "4" ranking and one "3" ranking, yet thirteen "1" rankings (see Figure 3.13).

***Oyster Reef*:** Oyster reef services included provision of habitat and food for wildlife (3.10), water clarity (2.60), commercial harvest (2.40) and recreational opportunities (1.90) (see Figure 3.12).

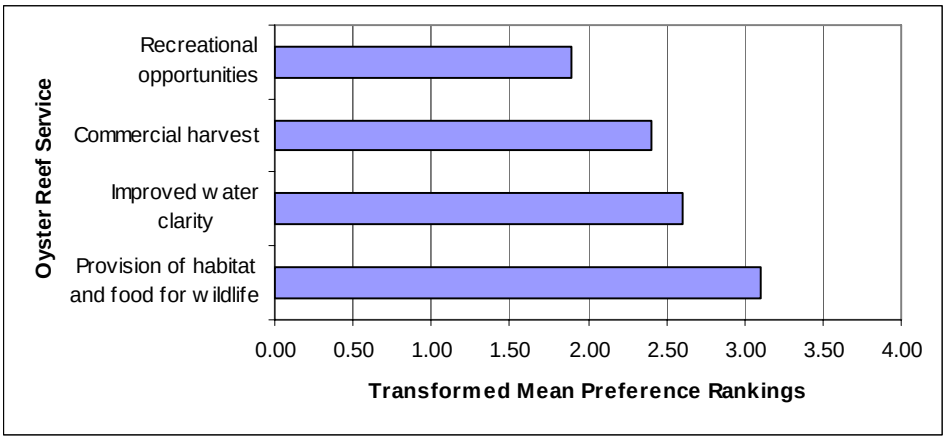

Figure 3.12: Oyster Reef Service Preferences, Wilmington

Quite a few participants said they were unfamiliar with oyster reef, and others wanted to know if it was the same thing as an oyster bed. Most said our definition:

> "Oyster reefs are formed by the accumulation of oyster shells over hundreds of years"

did not produce a clear mental image. Again, services with direct human impacts received the lowest rankings, perhaps because participants were unfamiliar with oyster reef and did not associate it with human uses. It was surprising that water clarity fared so well (it received four "4" rankings and six "3" rankings) when participants again wanted to know why this service would be important to plants and animals. Provision of habitat and food for wildlife was clearly favored by respondents, receiving ten "4" rankings (see Figure 3.13).

***Discussion*:** Participants in the Wilmington focus groups again brought up unique decision-making criteria for their rankings. One participant said he ranked highest those services that would be more difficult to create elsewhere at a similar quality level, even if independently he did not prefer those services. Other participants asked whether they were ranking the services of natural or man-made habitats, but did not indicate whether knowing this information would change their service preferences. Figure 3.13 contains the summary rankings for the Wilmington focus groups.

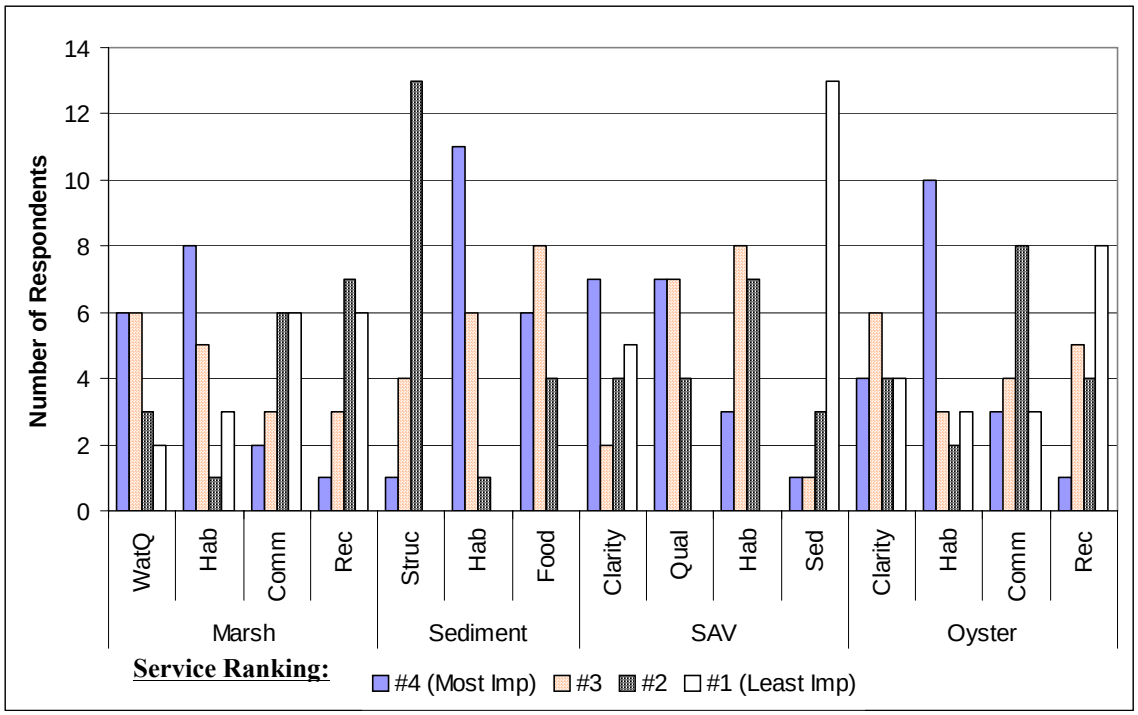

Figure 3.13: Service Ratings, Wilmington

3.4 Rockville Focus Groups #2

The last pair of focus groups again took place in Rockville, as it was the easiest site for the researchers to reach. Each focus group contained nine participants. Prior to undertaking these focus groups, we asked another staff biologist to review the habitat and service definitions for clarity and thoroughness. For the Rockville #2 focus groups, habitat descriptions were simplified and slightly expanded to better allow the respondent to develop a mental image of the habitat. Information was separated into smaller paragraphs to space out technical information. Additionally, service descriptions were given headings that were underlined, and the descriptions themselves were often expanded upon and simplified. Further changes are detailed below. Again, one respondent assigned the same number to more than one service across the habitats, and her responses were not included in this analysis.

Marsh: A primary production service was added to marsh. Water quality was also explained in further detail and the specific types of animals for which marsh provides protection were also described.

Participants ranked the services in the following order: provision of habitat for wildlife (3.71), water quality (3.53), recreational opportunities (3.00), primary production (2.88), and wildlife for commercial harvest (1.88) (see Figure 3.14).

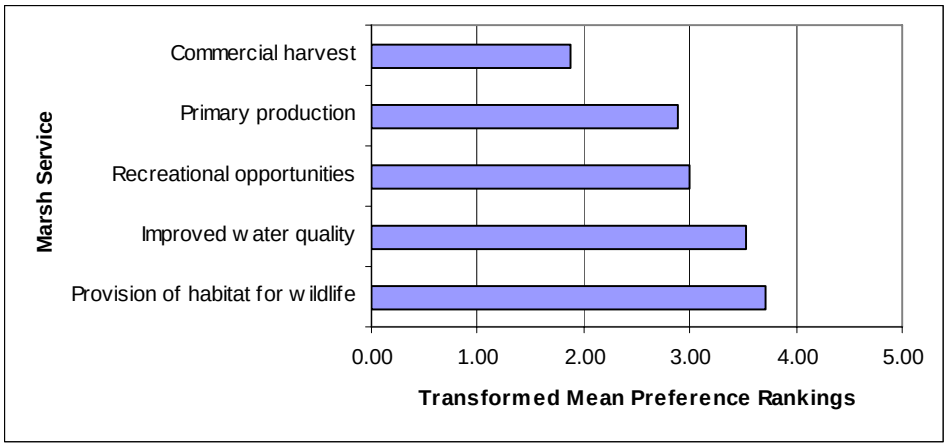

Figure 3.14: Marsh Service Preferences, Rockville #2

The only surprise was how well recreational opportunities fared in comparison to the other services. Additionally, although water quality ranked second, it received six "5" rankings, in comparison with no more than three "5" rankings for any other service (see Figure 3.18 in Rockville #2 discussion section). Finally, several respondents said that it was false to state that the water quality service did not affect drinking water, because their drinking water does flow through these marshes at some point.

Sediment: The statement, "they are not particles suspended in the water column" was removed from the habitat definition of sediment for the Rockville #2 focus groups, although it perhaps should not have been, as several respondents mentioned sedimentation as a negative marsh service. Recreational opportunities were reinserted as the research team wanted to always give respondents the opportunity to state whether recreational services were important to them. Primary production was also added as a service. Some respondents again mentioned that it was difficult to think of sediment as a habitat.

Participants ranked the services in the following order: provision of habitat for wildlife (3.82), structure for plants (3.53), food for higher-level animals (3.18), primary production (2.76), and recreational opportunities (1.71) (see Appendix IV and Figure 3.15). Provision of habitat received seven "5" rankings, while primary production received five, and structure for plants received three (the other two services received one each) (see Figure 3.18).

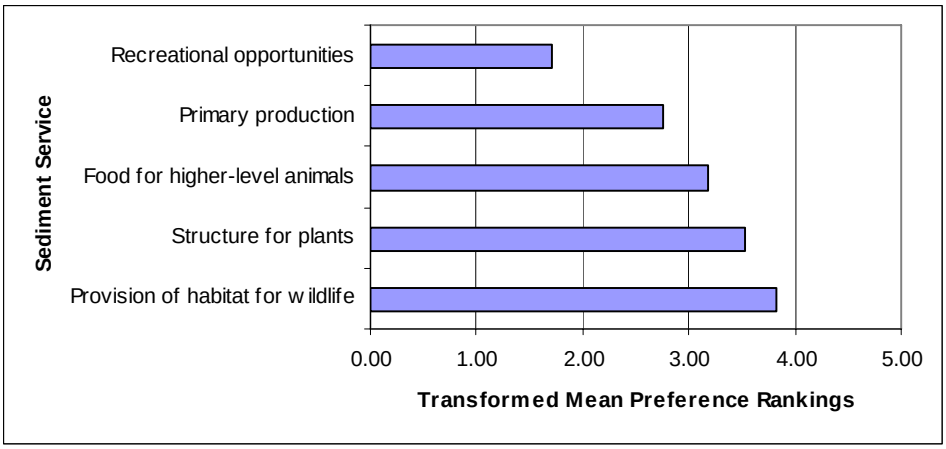

Figure 3.15: Sediment Service Preferences, Rockville #2

SAV: The water clarity service was removed, in response to its similarity to water quality, and to participants' concerns in Wilmington that plants and animals do not care how clear the water is. Primary production was added as a service, as was wildlife for commercial harvest and recreational opportunities. However, some participants mentioned that it was difficult to think of SAV as a habitat, and that they thought of it more as a group of plants. A clear definition of "habitat" might be needed. Finally, some respondents felt that the descriptions of primary production and water quality were too technical.

Participants ranked the services in the following order: water quality and provision of habitat and food for wildlife were tied (4.65), primary production (3.76), sediment stabilization (2.88), habitat for commercial harvest (2.76) and recreational opportunities (2.29) (see Figure 3.16). Primary production and water quality had five "6s", followed closely by habitat and food for wildlife with four (see Figure 3.18).

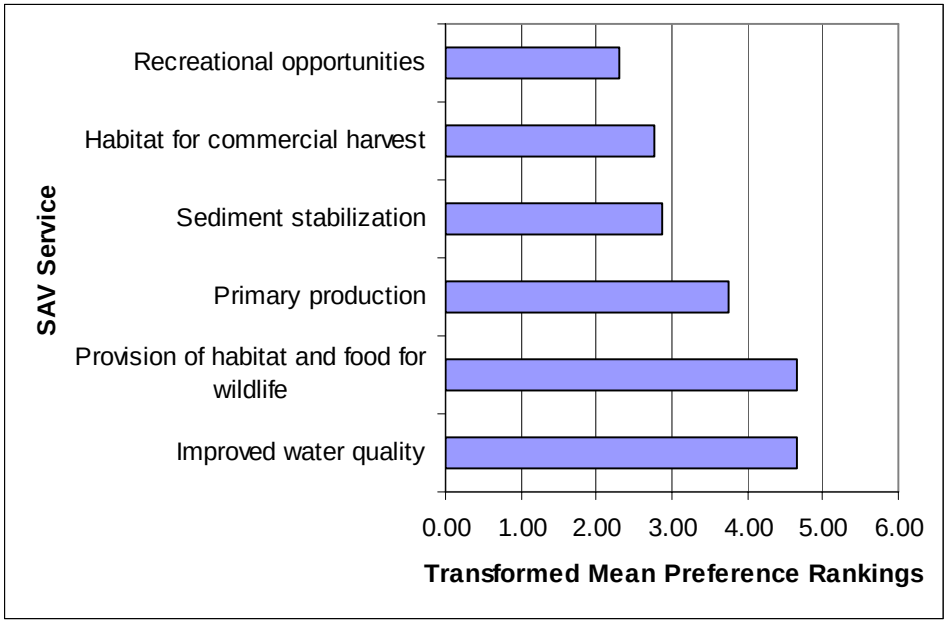

Figure 3.16: SAV Service Preferences, Rockville #2

***Oyster Reef*:** A much more thorough description of oyster reef was given in these focus groups, as some respondents in previous groups had admitted a complete unfamiliarity with this habitat. Water clarity was changed to oyster habitat, although oyster habitat was previously mentioned under the water clarity service in the Wilmington focus groups. Water filtration was also added, as it represents a crucial service provided by oyster reef.

Participants ranked the services in the following order: oyster habitat and provision of habitat and food for wildlife were ranked equally (3.59), water filtration (3.53), commercial harvest (2.41) and recreational opportunities (1.88) (see Figure 3.17).

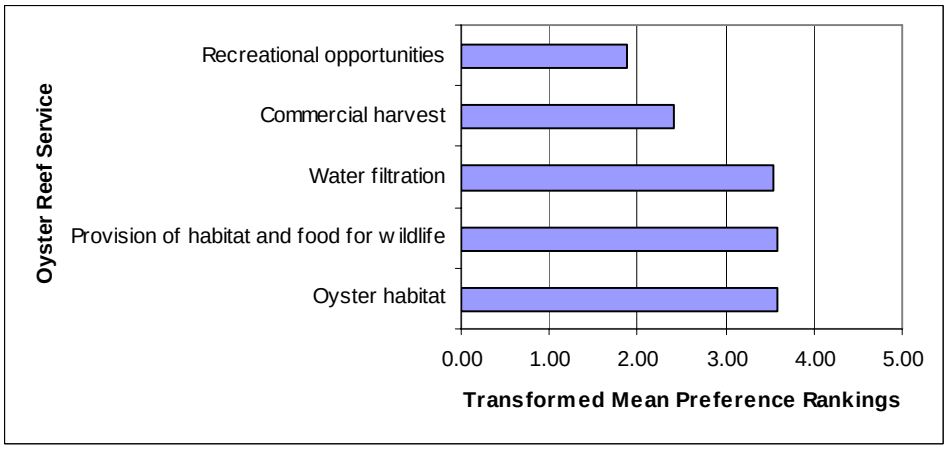

Figure 3.17: Oyster Reef Service Preferences, Rockville #2

Oyster habitat was ranked highly and received seven "5" rankings, probably because people value oysters in and of themselves. Water filtration received four "5" rankings (see Figure 3.18). It was interesting that water filtration was ranked above commercial harvest, as many respondents professed to love eating oysters.

Discussion: There were very few surprises in Rockville #2 as compared to previous focus groups. However, it was not appropriate to directly compare responses from Rockville #1 and #2, due to the small sample size involved and because considerable changes were made in the handouts from one set of groups to the next. Most respondents found the revised habitat descriptions to be clear; providing additional information regarding oyster reef was particularly helpful. However, respondents did again mention the idea of including negative services. It was also apparent that the definition of habitat should be more clearly defined. Figure 3.18 contains the summary rankings for the Rockville #2 focus groups.

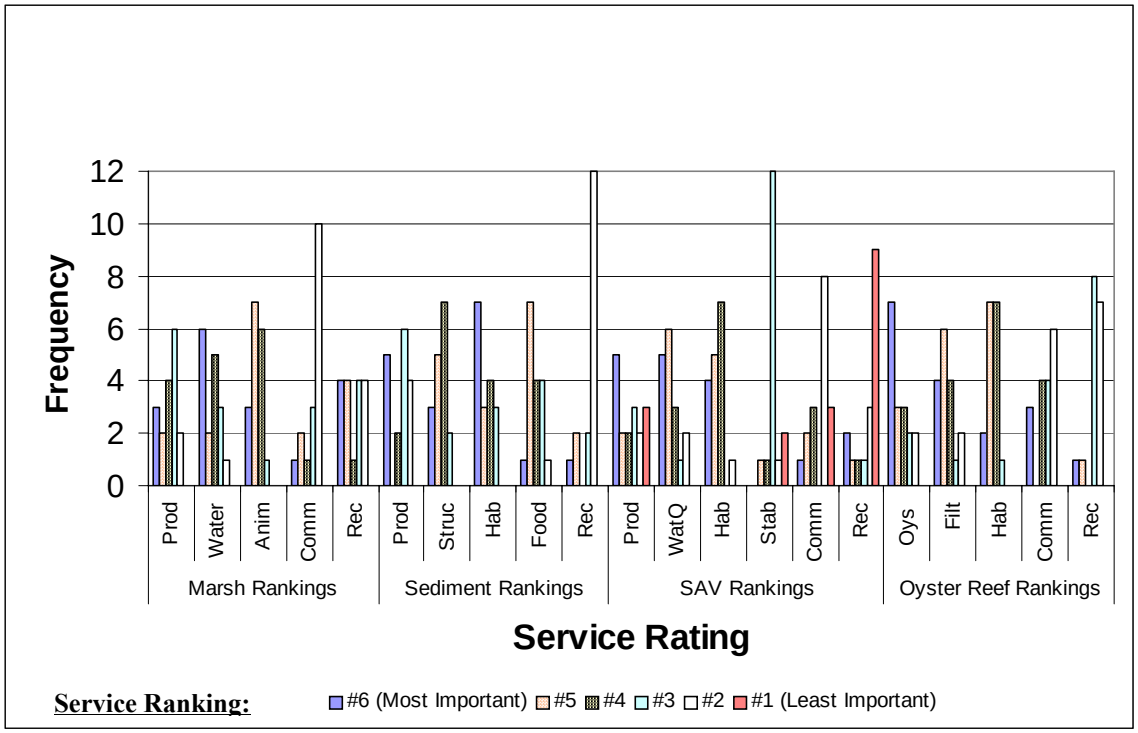

Figure 3.18: Service Ratings, Rockville #2

3.5 Habitat Service Preference Conclusions

In conclusion, people use different decision-making models and frameworks to rank services. For example, some respondents viewed some services as building blocks of others, whereas other respondents viewed each service independently.

People also seemed to prefer the same services across the habitats. However, they seemed to have a hard time distinguishing similar services from each other across habitats in terms of quantity and quality, which made the choice questions (to be discussed in the next chapter) more difficult. For example, some respondents had a

preference for the recreational aspects of habitats and others for their provision of food for humans. While the respondents could articulate such general tastes, many found it difficult to understand which habitats provided the best recreational opportunities or the most food production if the service was listed for multiple habitats. Fine-tuning the description of each service in the last set of focus groups (Rockville #2) helped respondents to make these distinctions.

Overall, people seemed to prefer those services that directly affected their health (such as water quality). However, this is countered by a trend toward valuing least direct human use services, such as commercial uses and recreation.

It is useful to note that the research team informally compared the recreational activities undertaken by participants to their responses, and found no correlation between activities enjoyed and habitat service preferences.

4. CHOICE-BASED SCENARIOS

This chapter details the findings from the choice-based scenarios included in each focus group. The focus groups served to test several variations of choice-based questions that could be used in a final survey to solicit the public's monetary values or tradeoff ratios for a suite of habitats. As noted in the previous chapter, the survey instrument was revised after each pair of focus groups. These revisions included significant changes to the choice-based scenario questions, and therefore preclude a direct comparison of the results from focus groups at the different locations.

Each section in this chapter will discuss the findings from one focus group pair (one location). Each section will provide information concerning the number of participants and the habitat types used at that location. Each section will then detail the choice-based scenario questions for each location, provide a summary of the quantitative results, and explore issues identified regarding these questions.

This cross habitat project is a form of stated preference research, which is common in the field of economics. Stated preference techniques rely on individuals' responses to verbal or written questions that reveal their preferences about a commodity, service, or program. The respondents' answers, rather than observations of respondents' actual behavior, are used to infer preferences. By presenting respondents with several options and asking each respondent to select his or her most preferred option, researchers can use modeling techniques to identify what components of each option are most highly valued by respondents.

The purpose of testing the choice-based scenarios in these focus groups is to craft a set of questions that will provide either monetary values or habitat tradeoff ratios when used in a random survey of the population.

4.1 Rockville Focus Groups #1

Both Rockville #1 focus groups had nine participants, and the handouts included information on estuarine marsh, sediment, and ocean beaches. The Rockville #1 focus group participants were presented three choice-based scenario questions: one concerning a development scenario and two regarding a preservation program.

Rockville #1 Development Scenario: The first choice-based question involved a "housing and infrastructure development on the Delmarva peninsula" that would destroy estuarine marsh, sediment, and publicly accessible ocean beach. The participants were told that the development was to occur, but that the site was not yet selected. They were presented with three sites, each with varying losses of marsh, sediment, and beach, and asked to select the location they most preferred for the development, given that some development would occur. The three habitats lost 10, 15, or 20 acres at each of the three sites and the sites varied according to which habitat lost which acreage. It is expected that the respondent would select that site for development that provided the least utility.

Thus, the response to this question can be used to infer which of the three combinations of habitats the respondent least prefers.

In general, site selection is likely to be influenced by one of three positions. First, the participant may have a strong affinity for one of the three habitat types. In wanting to preserve this one habitat, the participant will choose that site which loses the least amount of this habitat. Second, the participant may have a strong aversion to one of the habitats. The participant may respond to the question by selecting the site that loses the most of this habitat, thereby preserving a relatively larger quantity of the other two habitats. Third, if the participants are indifferent between all three habitats, their responses will be random and without useful meaning for the research team. It should be noted that it is not possible to infer which position a respondent holds based solely on the response to the choice-based question.

The results of the first question are presented in Table 4.1 and are summarized in Table 4.2. As is explained in the oral focus group instructions in Appendix II, the participants were told that none of their responses would be directly attributable to them. For data tracking purposes, we have included the first one or two letters of the respondents' first names in the data tables along with their gender. This information allows the reader to follow a single respondent's answers to multiple questions, but protects the anonymity of the participant.

In each focus group, five participants selected site 3 and four participants selected Site 2. Site 2 minimizes loss to ocean beach and maximizes loss to sediment. Site 3 minimizes marsh loss but maximizes beach loss. There are multiple ways to interpret these data. Selection of Site 2 implies an affinity for beaches or a comparative aversion to sediment. These preferences are not surprising. It is likely many participants have had positive recreational experiences at ocean beaches and derive great utility from them. Also, of the three habitats, it is likely that participants have had the least direct past experience with sediments, and would derive the least utility from this habitat. Selection of Site 3 implies an affinity for marsh or a comparative aversion to ocean beaches. Given that recreational trips to beaches are common and usually positive, it is unlikely that participants have an aversion to this habitat. It is more likely that participants selected Site 3 to minimize marsh loss because it provides the greatest utility. There was significant discussion during the focus groups about the amount of wetland that had already been lost in the area due to development. It would have been interesting to ask those participants that selected Site 3 (marsh loss minimization, ocean beach loss maximization) if their choice would change if presented an alternative site that lost 10 acres of marsh, 20 acres of sediment, and 15 acres of ocean beach. Given the preferences exhibited during the focus group, it is likely that most or all of the participants would switch their selection to this new alternative.

Zero participants selected Site 1, which maximizes marsh loss and minimizes sediment loss. This is not a surprising finding. Of the three habitats, participants likely had the least personal experience with sediment and the habitat description handout does not

offer compelling reasons to select preservation of this habitat over either marsh or ocean beach.

Table 4.1 Rockville #1 focus group development scenario results.

Name	Gender	FG	Site 1* M-S-B	Site 2* M-S-B	Site 3* M-S-B	Choice
T	F	1	20-10-15	15-20-10	10-15-20	3
W	M	1	20-10-15	15-20-10	10-15-20	3
O	M	1	20-10-15	15-20-10	10-15-20	3
L	M	1	20-10-15	15-20-10	10-15-20	3
R	M	1	20-10-15	15-20-10	10-15-20	2
J	F	1	20-10-15	15-20-10	10-15-20	2
S	F	1	20-10-15	15-20-10	10-15-20	2
K	F	1	20-10-15	15-20-10	10-15-20	2
M	F	1	20-10-15	15-20-10	10-15-20	3
S	M	2	20-10-15	15-20-10	10-15-20	2
L	F	2	20-10-15	15-20-10	10-15-20	3
H	F	2	20-10-15	15-20-10	10-15-20	3
M	F	2	20-10-15	15-20-10	10-15-20	2
M	M	2	20-10-15	15-20-10	10-15-20	3
W	M	2	20-10-15	15-20-10	10-15-20	2
Sa	F	2	20-10-15	15-20-10	10-15-20	3
Su	F	2	20-10-15	15-20-10	10-15-20	2
J	M	2	20-10-15	15-20-10	10-15-20	3

* The numbers presented in the site columns indicate the amount of habitat that would be lost. The numbers are presented as marsh-sediment-beach lost, in acres.

Table 4.2 Rockville #1 focus group development scenario summary.

Focus Group	Number of Participants that Selected:		
	Site 1 20M-10S-15B	Site 2: 15M-20S-10B	Site 3: 10M-15S-20B
1	0	4	5
2	0	4	5
Sum	**0**	**8**	**10**

Rockville #1 Preservation Program: The second and third choice-based questions presented to Rockville #1 focus group participants entailed a government preservation program. The scenario was described as a program to purchase conservation easements that would prevent future development. Perpetual protection of marsh, sediment, and ocean beach is the benefit of the program. The cost was explained as a one-time increase in the participant's property tax. For the second question, respondents were presented with two options. The first option was an active preservation program that would protect 5 acres of marsh, 10 acres of ocean beach, and 4 acres of sediment. The cost of this option was a one-time increase in the participants' property tax. Three participants in

each focus group were presented with $5, $10, and $20 tax increases. The second option was the status quo; this involved no preservation at zero cost.

The results for both preservation program questions are detailed in Table 4.3 and summarized in Table 4.4. Fifteen of the eighteen participants selected Option A in the second question, two selected the status quo option of no preservation, and one did not respond to the question. From these data, it appears that many individuals have a positive willingness to pay for the conservation easement program described in the scenario. Both participants that selected the status quo option were posed a $20 cost for the active preservation scenario.

The third question presented the participants with two active preservation scenarios and asked them which they most preferred. There was no status quo alternative with this question. Option A was identical to the active preservation scenario in the second question. Option B would result in the protection of 7 acres of marsh, 5 acres of ocean beach, and 7 acres of sediment. The cost of both options, posed as a one-time increase in property taxes, was $10 for all eighteen participants.

The results of the third question are evenly split. Seven participants selected Option A (comparatively more beach preservation) and eight participants selected Option B (comparatively more marsh and sediment protection). For the reasons cited in the commentary on the development scenario, it is likely that selection of Option B represents an affinity for marsh rather than an affinity of sediment. If this assumption is correct, the participants were evenly divided in their desire for maximum beach and maximum marsh preservation.

Three participants, including the one that did not respond to the second question and the two that selected the status quo option in the second question, did not answer the third question. For the two that selected the status quo option, their non-response to the third question can be interpreted as indicating that both active preservation options provided less utility than a no preservation alternative. However, the absence of a status quo option for the third question meant that these respondents could not express those preferences. Changes were made to the instrument prior to the Virginia Beach focus groups to include a three-alternative question format for the choice-based scenarios, with one of the alternatives being the status quo.

Table 4.3 Rockville #1 focus group habitat preservation question results.

Name	Gender	FG	Question 2			Question 3		
			Option A* M-B-S-$	Status Quo* M-B-S-$	Option Selected	Option A* M-B-S-$	Option B* M-B-S-$	Option Selected
T	F	1	5-10-4-$20	0-0-0-$0	SQ	5-10-4-$10	7-5-7-$10	blank
W	M	1	5-10-4-$20	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B
O	M	1	5-10-4-$20	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B
L	M	1	5-10-4-$10	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B
R	M	1	5-10-4-$5	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B
J	F	1	5-10-4-$5	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	A
S	F	1	5-10-4-$5	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	A
K	F	1	5-10-4-$10	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	A
M	F	1	5-10-4-$10	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B
S	M	2	5-10-4-$5	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	A
L	F	2	5-10-4-$10	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B
H	F	2	5-10-4-$20	0-0-0-$0	blank	5-10-4-$10	7-5-7-$10	blank
M	F	2	5-10-4-$10	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	A
M	M	2	5-10-4-$20	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B
W	M	2	5-10-4-$10	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	A
Sa	F	2	5-10-4-$20	0-0-0-$0	SQ	5-10-4-$10	7-5-7-$10	blank
Su	F	2	5-10-4-$5	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	A
J	M	2	5-10-4-$5	0-0-0-$0	A	5-10-4-$10	7-5-7-$10	B

* The numbers presented in the option columns indicate the amount of habitat that would be protected, and the price of protecting them. The numbers are presented as marsh-beach-sediment-price (habitat amounts in acres).

Table 4.4 Rockville #1 focus group habitat preservation question summary.

Focus Group	Number of Participants that Selected:			
	Question 2		Question 3	
	Option A 5M-10B-4S	Status Quo 0M-0B-0S	Option A 5M-10B-4S	Option B 7M-5B-7S
1	8	1	3	5
2	7	1	4	3
Sum	**15**	**2**	**7**	**8**

In addition to the quantitative data obtained from the participants' written responses to the instrument questions, valuable information was provided by the participants' discussion of the choice-based scenarios. Perhaps the most important information obtained through discussion related to the believability of the scenarios. It is necessary for respondents to believe that the described scenario could be a reflection of a current or future program. If respondents do not feel the scenario is realistic, researchers cannot expect the preferences expressed through responses to instrument questions to accurately reflect the respondents' true underlying preferences.

Participants in the Rockville #1 focus groups expressed several doubts about the believability of the scenario. Several individuals noted that the total amount of habitat preserved (19 acres) was relatively small given the total amount the state would collect

through a $5, $10, or $20 statewide property tax increase. These individuals said that, for the scenario to be believable, the programs would have to protect significantly more habitat given the size of the tax increase. One individual remarked that there was little beach remaining in Maryland to be developed, so including a loss of beach in the scenario was unrealistic. Related to this point, other respondents said they felt that the dollar amounts in the preservation scenario could be higher. They doubted that the state would ask property owners their opinions of such a small change in their tax obligation. Others were skeptical that the property tax increase would be used for the conservation program.

Estimating willingness to pay for environmental protection through stated preference modeling techniques requires that respondents believe their payments would go toward the stated program or service. However, the respondents indicated that this did not affect their selections. In addition, respondents expressed a strong desire to know more about the development project: the type and number of residential units, location, construction firms, materials to be used, and the types of habitats to be lost. Significant effort was made prior to the Virginia Beach focus groups to address these concerns and craft a scenario that was more believable.

Rockville #1 Summary: Valuable information was obtained concerning the amount of information required by potential respondents. In addition, choice-based question design issues were highlighted. Specifically, the need for a status quo option in all questions was identified to eliminate the situation in which respondents are forced to choose between two preservation scenarios that may result in a decrease in utility as compared with the current situation. However, the results from this pair of focus groups were mixed. Responses to the development scenario indicated a possible affinity for both marsh and ocean beaches, and a possible aversion to sediment. Little can be definitively drawn from these results given the small sample size and the nature of the habitat mixes selected for the questions.

4.2 Virginia Beach Focus Groups

Each of the Virginia Beach focus groups had nine participants, and the handouts included information on estuarine marsh, sediment, and submerged aquatic vegetation. Several changes were made to the choice-based scenario questions following the Rockville #1 focus groups. First, the number of questions was reduced from three to two. The first question retained the development scenario used in the Rockville #1 focus groups. The second question was a three-alternative conjoint analysis question that combined the second and third questions from the Rockville #1 session. Next, respondents were given a greater degree of information concerning the development and preservation scenarios. This was an effort to further define the good that was the focus of the choice occasion. Finally, the questions were altered to reflect the changes in habitats used in this focus group location. Ocean beaches were eliminated from the choice-based questions and submerged aquatic vegetation (SAV) was added.

Virginia Beach Development Scenario: The Virginia Beach focus group participants were presented two choice-based scenario questions. The first scenario involved a new housing and infrastructure development "in a coastal county in your state". This development was to occur at one of three potential sites. The sites differed based on varying levels of marsh, sediment, and SAV that would be lost due to the development. This scenario asked respondents to choose which of the three sites they would prefer for the new development, given that development will occur. Therefore, the respondents were asked to select the one site they were most willing to forego. It is assumed that respondents chose the site that provides them with the least utility.

Because the research team wished to have participants express their preferences over a range of habitat loss combinations, it was decided to use two different sets of attribute levels for this question in each focus group. For simplicity, these sets of attribute levels are labeled Set A and Set B. Each focus group had nine participants. Four participants in the first focus group received Set A and five participants received Set B. The pattern was reversed in the second focus group, with five participants receiving Set A and four receiving Set B. Each site listed in the question loses a total of 45 acres. One habitat loses 10 acres, another 15, and the last loses 20. The sites differ on how much acreage each habitat loses.

Prior to conducting the focus groups, it was thought that participants would prefer marsh and SAV to sediment. This hypothesis was based on the expectation that many participants may have had positive past experiences with marsh and SAV, and that the services described for these two habitats are generally more compelling than those described for sediment. It is expected that the site selected by each participant is the one that provides the least utility. In general, this selection is likely to be influenced by one of two positions, as discussed for the Rockville #1 choice-based scenario questions.

The attribute levels and results from this question are presented in Table 4.5 and summarized in Table 4.6. The information is displayed in the table by attribute level set,

rather than by focus group, to facilitate discussion of the results. Of the nine participants presented attribute level Set A, six selected Site 1A. If development occurs at this site, the public would lose 10 acres of marsh, 20 acres of sediment, and 15 acres of SAV. This selection conforms to the hypothesis that participants will choose to minimize the loss of marsh and maximize the loss of sediment. However, two participants selected Site 2A, which minimizes sediment loss and maximizes SAV loss. These observations are contrary to the hypothesis. There was much less uniformity among participants presented with attribute level Set B. Three participants selected Site 1B, four selected Site 2B, and two selected Site 3B. Few generalizations can be made based upon these nine observations.

Table 4.5 Virginia Beach focus group development scenario results.

Name	Gender	FG	Set	Site 1* M-S-V	Site 2* M-S-V	Site 3* M-S-V	Site Selected
D	F	1	A	10-20-15	15-10-20	20-15-10	1
J	M	1	A	10-20-15	15-10-20	20-15-10	1
E	F	1	A	10-20-15	15-10-20	20-15-10	1
Ro	M	1	A	10-20-15	15-10-20	20-15-10	2
Ro	F	2	A	10-20-15	15-10-20	20-15-10	3
M	F	2	A	10-20-15	15-10-20	20-15-10	2
J	M	2	A	10-20-15	15-10-20	20-15-10	1
C	M	2	A	10-20-15	15-10-20	20-15-10	1
R	M	2	A	10-20-15	15-10-20	20-15-10	1
B	F	1	B	20-10-15	15-20-10	10-15-20	1
A	F	1	B	20-10-15	15-20-10	10-15-20	3
N	M	1	B	20-10-15	15-20-10	10-15-20	2
R	M	1	B	20-10-15	15-20-10	10-15-20	2
H	M	1	B	20-10-15	15-20-10	10-15-20	1
L	F	2	B	20-10-15	15-20-10	10-15-20	2
J	F	2	B	20-10-15	15-20-10	10-15-20	2
R	M	2	B	20-10-15	15-20-10	10-15-20	1
Re	F	2	B	20-10-15	15-20-10	10-15-20	3

* The numbers presented in the site columns indicate the amount of habitat that would be lost. The numbers are presented as marsh-sediment-SAV lost, in acres.

Table 4.6 Virginia Beach focus group development scenario summary.

Question Set	Number of Participants that Selected:		
	Site 1	Site 2	Site 3
Set A	6	2	1
Set B	3	4	2

In addition to examining the results of this question based on attribute level set, the participants' selections can be analyzed by focus group. By doing so, it may be possible to identify strong differences in preference for or against certain habitats based solely on the dynamics of the focus group. If such differences are observed, they provide an indication that the habitat type discussions in each focus group were different enough to bias participants' responses in favor of or against a certain habitat type.

At the simplest level, the results can be summarized by the number of individuals choosing to minimize and maximize loss of each habitat. Such a summary is presented in Table 4.7. Participant responses can be interpreted as maximizing the loss of the least favorable habitat. Of the eighteen participants, ten chose to maximize sediment loss. The remaining eight split the desire to maximize the loss of marsh and SAV. Conversely, site selection can be interpreted as minimizing the loss of the most favorable habitat. With this interpretation, eight participants chose to minimize marsh loss, and five each chose to minimize sediment and SAV loss. When analyzed in this manner, the two focus groups were nearly identical in their responses.

Table 4.7 Summary of lost habitat minimization and maximization by the Virginia Beach focus group.

FG	# of Participants Choosing to Lose the Most:			# of Participants Choosing to Lose the Least:		
	Marsh	Sediment	SAV	Marsh	Sediment	SAV
#1	2	5	2	4	3	2
#2	2	5	2	4	2	3
Sum	4	10	4	8	5	5

In summary, the result of this choice-based scenario question is ambiguous. Participants may be exhibiting an affinity for marsh and SAV, and an aversion to sediment, but the results are far from convincing.

Virginia Beach Preservation Program: The second choice-based scenario presented to Virginia Beach focus group participants entailed a government preservation program. The scenario was described as a program to purchase conservation easements that would prevent future development. Perpetual protection of marsh, sediment, and SAV is the benefit of the program. The cost was explained as a one-time increase in the participant's property tax. Respondents were presented with three options. Two involved preservation of varying quantities of the three habitats and had a positive property tax increase. The

third scenario was the "status quo" option; it provided no protection at zero cost to the participant. Inclusion of this option prevents the participant from being forced to choose between two preservation scenarios that may result in a decrease in utility as compared with the respondents' current situation, as was the case with the third choice-based scenario from Rockville #1.

The two preservation options entailed protection of different amounts of each habitat. Option A would protect 20 acres of marsh, 40 acres of sediment, and 15 acres of SAV. Option B would protect 30 acres of marsh, 25 acres of sediment, and 20 acres of SAV. These benefits were identical for all eighteen participants. The cost was either $20 or $30. In the first focus group, five participants were presented a cost of $20 for both options and four were presented a $30 cost. In the second focus group, four were offered $20 and five were presented with $30. For all eighteen participants, Option C was the status quo choice, with no preservation and no cost.

If a participant chooses a preservation scenario over the status quo option, there are two strategies that they may have pursued. First, the participant may have an affinity for a particular habitat, and their selection is based on which option preserves the most acreage of that habitat. If this strategy accurately describes the decision-making process for some participants, those with an affinity for sediment would select Option A and those with affinities for either marsh or SAV would select Option B. The second strategy entails a lack of preference for a specific habitat, or defined but equal preferences across all habitats. Given this preference structure, participants would likely select the option that most evenly preserves all three habitat types. With the choices offered, those following this decision-making process would select Option B. Thus, selection of Option A signifies an affinity for sediment and selection of Option B indicates an affinity for marsh, SAV and/or equal preferences across all three habitat types.

The results are presented in Table 4.8 and summarized in Table 4.9. Eleven of the eighteen participants selected option B. This selection implies an affinity for marsh, an affinity for SAV, or equal preference across all three habitats. Three participants chose Option A, which implies an affinity for sediment. Four participants selected the status quo Option C. Of these four, three were presented a cost of $30 and one a cost of $20. It is not possible to determine if these individuals would have selected a preservation option at a lower cost.

In general, fourteen of the eighteen participants were willing to pay at least $20 for one of the active preservation scenarios. Because of how the attribute levels were assigned to the options, it is not possible to determine the motivations for the participants to select Option B, which was obviously the most preferred choice.

Table 4.8 Virginia Beach focus group habitat preservation question results.

Name	Gender	FG	Option A* M-S-V-$	Option B* M-S-V-$	Option C* M-S-V-$	Option Selected
B	F	1	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
J	M	1	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
E	F	1	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
Ri	M	1	20-40-15-$20	30-25-20-$20	0-0-0-$0	C
H	M	1	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
D	F	1	20-40-15-$30	30-25-20-$30	0-0-0-$0	C
Ro	M	1	20-40-15-$30	30-25-20-$30	0-0-0-$0	A
A	F	1	20-40-15-$30	30-25-20-$30	0-0-0-$0	C
N	M	1	20-40-15-$30	30-25-20-$30	0-0-0-$0	B
J	F	2	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
Re	F	2	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
Ro	F	2	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
J	M	2	20-40-15-$20	30-25-20-$20	0-0-0-$0	B
L	F	2	20-40-15-$30	30-25-20-$30	0-0-0-$0	B
Rk	M	2	20-40-15-$30	30-25-20-$30	0-0-0-$0	B
M	F	2	20-40-15-$30	30-25-20-$30	0-0-0-$0	A
C	M	2	20-40-15-$30	30-25-20-$30	0-0-0-$0	C
R	M	2	20-40-15-$30	30-25-20-$30	0-0-0-$0	A

*The numbers presented in the option columns indicate the amount of habitat that would be preserved and the cost of preservation. The numbers are presented as marsh-sediment-SAV-cost (habitat quantities in acres).

Table 4.9 Virginia Beach focus group habitat preservation summary.

Focus Group	Number of Participants that Selected:		
	Option A 20M-40S-15V	Option B 30M-25S-20V	Option C No Preservation
#1	1	5	3
#2	2	6	1
Sum	**3**	**11**	**4**

The qualitative information obtained through questions and discussion after the completion of the choice-based scenario portion of the instrument was again helpful. Respondents expressed a desire to be provided more information on the type of development that would occur, and wanted contextual information about the amount of each habitat in the region. There was also some confusion about how long the protection would last, even though the survey instrument noted that the purchase of conservation easements would protect the habitat into perpetuity.

There were several comments made that suggest survey design and implementation problems. First, there were a couple of individuals with evident protest bids. When asked why they selected the no action status quo options, the participants informed the facilitator that they were not against environmental protection, but felt they paid too much in taxes already and would not voluntarily pay more. Second, there is also evident starting point bias. When asked if they would be willing to pay more than the price listed

in the questions ($20 or $30), most respondents said no. Such a suite of responses is evidence that the respondents are taking cues from the survey instrument as to what their willingness to pay should be. Third, there may be an incentive problem with using property taxes as the payment vehicle. As renters do not directly pay property tax, their responses to the preservation questions may be influenced by their belief about the likelihood of their landlord passing along the tax increase to them in the form of higher rent. If renters do not believe they would have their rent adjusted because of a minor property tax increase, then they may indicate a high willingness to pay for the program in the belief that they would never personally pay for the program. Thus, renters may strategically respond to the research questions to free ride on the provision of environmental services. Specific questions targeting this free-riding possibility were incorporated for the Wilmington focus groups.

Several respondents were also probed for information on their decision-making rationale. Several respondents indicated that if they were unable to order the habitat types by preference, they simply chose those options that distributed the protection or loss evenly across the habitats. This suggests that the even distribution selections were made more because of a lack of defined preferences rather than the respondents equally preferring all habitat types.

Virginia Beach Summary: A significant number of participants indicated a willingness to pay of at least $20 for the active preservation scenarios. The confirmation of a positive willingness to pay, based on a choice question containing a no preservation status quo option, is a significant finding of the Virginia Beach focus group session. The results of the choice-based scenarios suggest a slight affinity for marsh and/or SAV, and the possible affinity for an even distribution preservation program.

4.3 Wilmington Focus Groups

The Wilmington focus groups involved 17 participants, and included marsh, sediment, SAV, and oyster reefs as the habitats of interest. After reviewing the information from the Virginia Beach focus groups, it was determined that the project team had collected a significant amount of information from the habitat description section of the instrument. It was decided to spend more of the two-hour sessions on the choice-based scenarios, and so the Wilmington focus group participants were presented with four such questions. The first three of these questions were linked to the same scenario and will be discussed together.

Wilmington Revitalization Project: For these three questions, the participants were informed that a "new public waterfront revitalization project in a coastal county in your state" was to be undertaken. This reflects a change from the private development scenario used in the Rockville #1 and Virginia Beach focus groups. This change was made because many participants in Rockville and Virginia Beach focused on the nature of the development rather than on the ecological loss associated with it. It was expected that a public revitalization project would be less objectionable, and therefore participants would focus more on the ecological losses. In addition, more contextual information was provided to the participants about the revitalization project in response to comments received during the first four focus groups.

This project included reclamation of a portion of a waterway, which would result in the loss of 45 acres of sediment through conversion to development. To compensate for this loss, the government would complete one of six restoration projects. Each project entailed the creation of estuarine marsh, oyster reef, or submerged aquatic vegetation beds. All projects explicitly indicated they would provide zero acres of sediment replacement.

The first question presented participants with three projects, each with a total of 45 acres of habitat gains spread across three habitat types. For all eighteen participants, Project 1 was an even distribution of 15 acres of created marsh, oyster reef, and SAV. The distribution of created habitat for Projects 2 and 3 varied by focus group (but all respondents within a focus group received the same distribution). The attribute levels were 10, 15, and 20 acres. Participants were asked to select their most preferred project to compensate for the 45 acres of sediment that would be lost due to the revitalization. It is assumed that the selected project would be the one that would provide the participant with the most utility.

The second question presented three additional projects, and participants were again asked to select that which they most preferred. Project 4 was an unbalanced distribution, and the attribute levels varied by focus group. The first group was presented with a project that would provide 30 acres of marsh but only five acres each of oyster reef and SAV. The second focus group was presented with 30 acres of oyster reef but only five each of marsh and SAV. Projects 5 and 6 were similar to Projects 2 and 3 in that they

provided 10, 15, and 20 acres, with the distribution varying between focus groups. It is important to note that the project team intentionally constructed Project 4 so that it would provide only 40 acres of total habitat creation, while the other five projects each created 45 acres. The team was interested in knowing if participants would read the information carefully enough to discover the discrepancy.

The third question asked the participants to consider the two projects they had selected in questions one and two. After consideration, the participants were asked to indicate which of these projects was their most preferred.

The results from these three questions are provided in Table 4.10 and summarized in Table 4.11. Examination of the first question results indicates a strong difference between focus groups. Seven of the nine participants in the first focus group choose Project 1 with its even distribution. The other two participants choose the project that maximized SAV creation at 20 acres. This project also minimized oyster reef creation (and thereby maximized the creation of marsh and SAV combined). No participant selected the project that minimized marsh and maximized oyster reef. Contrastingly, only two of the nine participants in the second focus group selected the even distribution Project 1. This is likely a significant difference between the focus groups. Six of the second focus group participants selected the project that maximized marsh creation and minimized oyster reef creation.

Three conclusions can be drawn from these results. First, since exactly one-half of the participants selected the even distribution option, many participants either derive the same utility from an acre of each habitat or they do not have defined preferences. This will be discussed further in the next chapter of this report. Second, when the option to maximize marsh at 20 acres (only focus group 2) was available, two-thirds of participants selected this project. Third, focus group #1 participants were offered a project that minimized marsh creation at 10 acres (Project 2), and zero participants chose this option. In summary, it appears that participants have an affinity for the even distribution or for marsh.

Table 4.10 Results from the Wilmington focus groups habitat creation choice-based scenario questions

Name	Gender	FG	Question 1				Question 2				Question 3
			Project 1* M-O-V	Project 2* M-O-V	Project 3* M-O-V	R1	Project 4* M-O-V	Project 5* M-O-V	Project 6* M-O-V	R2	R3
J	F	1	15-15-15	10-20-15	15-10-20	1	30-5-5	20-10-15	15-20-10	4	1
K	M	1	15-15-15	10-20-15	15-10-20	1	30-5-5	20-10-15	15-20-10	5	1
U	M	1	15-15-15	10-20-15	15-10-20	3	30-5-5	20-10-15	15-20-10	6	3
F	M	1	15-15-15	10-20-15	15-10-20	1	30-5-5	20-10-15	15-20-10	5	5
Ra	M	1	15-15-15	10-20-15	15-10-20	1	30-5-5	20-10-15	15-20-10	5	5
Ro	M	1	15-15-15	10-20-15	15-10-20	1	30-5-5	20-10-15	15-20-10	5	1
F	F	1	15-15-15	10-20-15	15-10-20	1	30-5-5	20-10-15	15-20-10	5	5
S	F	1	15-15-15	10-20-15	15-10-20	1	30-5-5	20-10-15	15-20-10	5	1
E	M	1	15-15-15	10-20-15	15-10-20	3	30-5-5	20-10-15	15-20-10	5	3
L	M	2	15-15-15	20-10-15	15-20-10	2	5-30-5	10-20-15	15-10-20	6	6
B	F	2	15-15-15	20-10-15	15-20-10	2	5-30-5	10-20-15	15-10-20	6	6
Mi	M	2	15-15-15	20-10-15	15-20-10	2	5-30-5	10-20-15	15-10-20	6	6
K	M	2	15-15-15	20-10-15	15-20-10	2	5-30-5	10-20-15	15-10-20	6	6
M	F	2	15-15-15	20-10-15	15-20-10	1	5-30-5	10-20-15	15-10-20	6	1
J	F	2	15-15-15	20-10-15	15-20-10	3	5-30-5	10-20-15	15-10-20	5	5
J	M	2	15-15-15	20-10-15	15-20-10	2	5-30-5	10-20-15	15-10-20	6	6
S	F	2	15-15-15	20-10-15	15-20-10	2	5-30-5	10-20-15	15-10-20	6	6
Ma	M	2	15-15-15	20-10-15	15-20-10	1	5-30-5	10-20-15	15-10-20	6	1

***** The numbers presented in the project columns indicate the amount of habitat that would be created. The numbers are presented as marsh-oyster reef-SAV in acres.

Table 4.11 Wilmington focus groups habitat creation summary.

Focus Group	Number of Participants that Selected:					
	Question 1:			Question 2:		
	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6
#1	7	0	2	1	7	1
#2	2	6	1	0	1	8

The results from the second question strengthen the summary from question 1. Only one of the eighteen participants selected the most unbalanced project (marsh maximization of 30 acres and only 40 total acres created). Seven of the nine first focus group participants selected the quasi-even distribution project that provided slightly more marsh (20 acres). Eight of the nine participants in the second focus group selected the project that maximized SAV creation. However, the balanced project that they were presented as an alternative entailed the minimization of marsh. From these results, it appears that participants have a disinclination to select a grossly unbalanced project. However, given a project that creates a more uniform mix of habitats, the edge seems to go to those that provide more marsh or SAV.

It is difficult to draw significant conclusions from the results of the third question. Of the seven first focus group participants that selected Project 1 (even distribution) in question 1, four of them choose Project 1 as their most preferred in question 3. The other three participants selected Project 5, which maximized marsh creation. The other two participants selected Project 3, which maximized SAV and minimized oyster reef creation. These results from the first focus group seem to support the finding that participants have a preference for either even distribution or marsh. However, the results from the second focus group trend away from this finding. Because of the uniformity of answers to questions one and two in the second focus group, six participants faced the same choice in question 3: Project 2 (marsh maximization, oyster minimization) or Project 6 (SAV maximization, oyster minimization). Because the habitat to be minimized was the same for both of these options, the question is reduced to a referendum on marsh or SAV for these six participants. All six participants selected the SAV-maximizing project. This is contrary to the results from the first focus group that suggested marsh was the preferred habitat type. In addition, this conclusion is unsupportive of the finding from questions one and two that participants favored either even distribution or marsh creation.

Wilmington Preservation Program: The fourth question was very similar to the preservation question included in the Virginia Beach focus groups. The scenario was described as a program to purchase conservation easements to protect sediment, marsh, oyster reef, and SAV. The cost was again a one-time increase in the property tax. The participants were presented with three options. For all eighteen participants, Option A was an equal distribution program; each habitat type would have 25 acres protected. Option B was an unequal distribution and the attribute levels varied by focus group. The first focus group was presented with a program that would protect 20 acres each of sediment, oyster reef, and SAV, and 40 acres of marsh. The second focus group was

offered protection of 40 acres of oyster reef and 20 acres each of the other three habitats. For all eighteen participants, Option C was the "status quo" option of no preservation at zero cost. Because the project team wished to explore a possible choke price for the preservation program, the two focus groups were presented different prices. The cost for Options A and B was $20 for the first focus group and $50 for the second.

Following the choice-based scenario question, the instrument asked two additional questions related to this scenario. The first question asked those participants that selected option A or B if they would be willing to pay more than the price listed. The participant was directed to circle yes or no. The second question asked those participants that circled yes what their maximum willingness to pay would be.

The results from these three preservation scenario questions are detailed in Table 4.12 and summarized in Table 4.13. In the first focus group, the participants were split five to four in choosing the equal distribution Option A and the marsh maximizing Option B. In the second focus group, seven participants selected the equal distribution Option A. No participant in the second focus group selected the oyster reef maximizing Option B. Two individuals selected the status quo Option C (when Options A and B cost $50). These findings strongly support the general trend of preference for either equal distribution or marsh dominance. Sixteen of the eighteen participants selected an active preservation scenario.

The answers to the two trailing questions are quite interesting, and indicate a difference between focus groups and potential survey complications. All nine participants in the first focus group selected an active preservation scenario at a cost of $20. However, only four were willing to pay more than the $20 offer price. One of these left blank the open-ended maximum willingness to pay question, and the other participants indicated $40, $45, and $50 maximums. Of the seven participants in the second focus group that selected an active preservation scenario, six said they would be willing to pay more than the $50 offer price. Four of these individuals indicated a maximum of $100, one indicated "$350-$500", and one wrote in a question mark.

Table 4.12 Wilmington focus group habitat preservation question results.

Name	Gender	FG	Option A*	Option B*	Option C*	Choice	WTP More?	How much?
J	F	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	B	N	--
K	M	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	A	Y	$40
U	M	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	A	Y	$50
F	M	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	A	Y	blank
Ra	M	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	B	N	--
Ro	M	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	A	N	--
F	F	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	B	N	--
S	F	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	B	N	--
E	M	1	25-25-25-25-$20	20-40-20-20-$20	0-0-0-0-$0	A	Y	$45
L	M	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	A	N	--
B	F	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	A	Y	"?"
Mi	M	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	A	Y	$350-$500
K	M	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	A	Y	$100
M	F	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	A	Y	$100
J	F	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	C	--	--
J	M	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	A	Y	$100
S	F	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	A	Y	$100
Ma	M	2	25-25-25-25-$50	20-20-40-20-$50	0-0-0-0-$0	C	--	--

* The numbers presented in the option columns indicate the amount of habitat that would be preserved and the cost of preservation. The numbers are presented as sediment-marsh-oyster reef-SAV-cost (habitat amounts in acres).

Table 4.13 Wilmington focus group habitat preservation question summary.

Focus Group	Number of Participants that Selected:		
	Option A Even Preservation	Option B Uneven Preservation	Option C No Preservation
#1	5	4	0
#2	7	0	2

Three conclusions can be made from these results. First, it appears that there was a difference between the focus groups on the importance of the active preservation scenario. Less than half of those in the first focus group were willing to pay more than the $20 offer price, and all but one respondent in the second focus group was willing to pay more than $50. Absent additional information about the participants, these results indicate that the discussions held in the two sessions prior to answering the choice-based scenario questions may have led the second focus group to place more importance on environmental protection. Second, the maximum willingness to pay amounts from the open-ended question were nearly double the offer price. Those presented with $20 responded with $40-$50 maximums and those offered $50 provided $100 maximums. These findings strongly suggest starting point bias, and will be discussed further in the next chapter of this report. Third, it appears that $50 may be a threshold value. Two participants in the second focus group selected the status quo option when the alternatives were priced at $50, and the three participants in the first focus group that provided maximum willingness to pay amounts said they would pay $50 or slightly less.

Information derived from questions and discussion about the choice-based scenarios revealed important information. As with the Rockville #1 and Virginia Beach focus groups, participants wanted more information about the development and preservation scenarios, and more contextual information in general. Many participants felt that the descriptions of the habitat services made each of the habitat types nearly identical. Given very similar service descriptions, it was difficult for many to form preferences that resulted in a rank-order for the habitats. Several participants said they would feel more comfortable defining their preferences if there was more information from scientists presented in the instrument. In particular, a scientific explanation of the relative benefits derived from each habitat was desired.

Wilmington Summary: Results from the choice based questions strongly indicate a preference for either marsh or an even distribution preservation program. Disturbingly, there appears to be strong evidence of starting point bias.

4.4 Rockville Focus Groups #2

The Rockville #2 focus groups involved 18 participants, and included marsh, sediment, SAV, and oyster reefs as the habitats of interest. None of the participants were the same as those that participated in the Rockville #1 focus groups. The fourth pair of focus groups involved three significant changes from the Wilmington focus groups. First, the participants were given the choice question handouts twice: once before and once after receiving the habitat services information. The project team wished to determine if participants' prior knowledge and experience influenced their choice selections more or less than the information provided in the habitat services handouts. The second change was that only the preservation based scenario was used in the choice based questions; the development scenario was dropped because of the anti-development sentiments expressed in previous focus groups. The scenario used for the choice based questions was identical to the preservation scenario described for question 4 in Wilmington. Third, the choice based questions each had four alternatives; all prior focus groups had involved choice based questions with two or three alternatives.

Rockville #2 Focus Group Process: As the focus group process for this set of focus groups differed from the process used in the previous three sets, it is worth explaining. Following the Rockville #1 focus groups, it was determined that discussion among focus group participants related to the habitat service handouts (material covered in Chapter 3) may influence participants' selections in the choice-based scenarios. The focus groups were conducted so that the habitat service handouts were completed and discussed prior to having the participants complete and discuss the choice-based questions. If a dominant participant directs discussion in favor of a single habitat during the first half of the focus group period (habitat service portion), then the choice-based scenario results of that focus group may be biased toward that habitat. Thus, the opinions of a single individual could influence the choice-based responses of the entire focus group.

For the Rockville #2 focus groups, as the participants entered the room, they were provided the handout on recreational activities. This was the first handout used in all eight focus groups. Upon its completion, the Rockville #2 participants were given a handout with three choice-based questions (with four alternatives each, a change from all previous focus groups). Since the participants had not been given any information on the habitats that formed the alternatives' attributes, the participants' responses would be based solely on their prior knowledge of and experience with the habitats. Then, the participants were given the habitat services handout, which had been substantially changed since Wilmington (see Section 3.4 of this report). The habitat descriptions were simplified and clarified, and additional services were identified for each habitat. It is at this point that the process for the two Rockville #2 focus groups differed. As was the practice with the first three pairs of focus groups, a discussion of the habitats, their services, and the participants' reactions and rankings was facilitated during the first focus group. After this discussion, the participants were given the fourth handout, which was identical to the choice-based question handout they had previously completed. No discussion was held prior to the completion of any of the handouts during the second

focus group; participants moved directly from the habitat services handout to the second choice-based question handout before a discussion was opened.

The rationale for this difference is based on the possibility of a dominant participant influencing the other participants' preferences during the discussion. In the first focus group there were two opportunities for participants to form or change their preferences: as they read the habitat service information and as they discussed that information with the other participants. It is possible that an outspoken or persuasive participant influenced other participants during the discussion. Participant responses to the second set of choice-based questions may reflect this influence. By delaying all discussion in the second focus group until after all handouts had been completed, this source of learning is eliminated. While it is admittedly a limited test, examination of the changes in choice-based question results may indicate whether the discussion overtly influenced participants' responses.

Rockville #2 Preservation Program Question 1: All three choice-based questions were related to the preservation scenario, and the attribute levels for all participants were identical within a focus group, but questions two and three differed between focus groups. The scenario was described as a program to protect sediment, marsh, oyster reef, and SAV. The cost was again a one-time increase in the property tax. The cost for all alternatives in each of the three questions was $20 and $50 for the first and second focus groups, respectively. For all participants in all questions, Option D was the status quo with no preservation at zero cost.

For the first question, all eighteen participants received an identical set of alternatives (except for the focus group-specific cost). Options A, B, and C were for the preservation of 100 acres of marsh, oyster reef, and SAV, respectively. The research team believed it very unlikely that sediment would be any participant's most preferred habitat. Because of this belief and the need to exclude one habitat to maintain a four alternative format with a status quo option, it was decided to omit an alternative consisting solely of 100 acres of sediment protection. As it was presented, the question was designed to determine which one habitat was most preferred by each respondent.

The results of the first question from both sets of handouts and focus groups are displayed in Table 4.14 and summarized in Table 4.15. In the first focus group, marsh and SAV appear to have been preferred based on the responses to the first handout. Four participants selected the marsh preservation alternative and three selected the SAV option. However, it appears there was some level of changing preferences due to the habitat service handouts and the discussion. The one participant that initially selected the oyster reef preservation alternative switched to SAV preservation, and one participant that initially selected SAV switched to marsh preservation. Based on the results of the second handout, five participants selected marsh as most preferred and three selected SAV. One respondent selected the no preservation alternative in both handouts.

Participants in the second focus group appeared to hold less firm preferences entering the session. In the first handout, three respondents selected the no preservation option and

one left the choice blank. Three others selected the SAV alternative, and one each the marsh and oyster reef options. After the habitat service handouts, four participants changed their selection (or made a selection in the case of the participant that originally left the question blank), and each changed to the marsh preservation alternative. As there was no discussion between participants during this focus group, this strongly suggests that the information provided in the habitat service handout was a key determinant of their preferences. Based on the results of the second handout, five participants selected marsh as most preferred, one selected oyster reef, one selected SAV, and two selected no preservation.

In sum, ten of the eighteen participants selected marsh as their most preferred habitat at the end of the session. Four others selected SAV, one chose oyster reef, and three opted for no preservation. It appears, from the responses to the first choice-based question, that many prefer marsh and that neither $20 nor $50 is an excessive cost for this level of preservation. Also, six of the eighteen participants switched the selections based upon information learned during the session.

Table 4.14 Rockville #2 focus group question one results.

Name	Gender	FG	Option A*	Option B*	Option C*	Option D*	Choice 1	Choice 2
K	F	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	A	A
J	M	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	B	*C*
M	M	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	A	A
T	M	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	C	C
J	F	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	C	*A*
A	F	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	A	A
G	M	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	A	A
S	M	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	C	C
SR	M	1	0-100-0-0-$20	0-0-100-0-$20	0-0-0-100-$20	0-0-0-0-$0	D	D
D	M	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	C	*A*
P	F	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	A	A
S	F	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	D	*A*
C	M	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	D	D
B	M	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	D	D
M	F	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	blank	*A*
P	M	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	B	B
N	F	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	C	C
D	F	2	0-100-0-0-$50	0-0-100-0-$50	0-0-0-100-$50	0-0-0-0-$0	C	*A*

* The numbers presented in the option columns indicate the amount of habitat that would be preserved and the cost of preservation. The numbers are presented as sediment-marsh-oyster reef-SAV-cost (habitat amounts in acres).

Table 4.15 Rockville #2 focus group question one summary.

Focus Group	Number of Participants that Selected:							
	Choice Occasion #1				Choice Occasion #2			
	Option A Marsh	Option B Oyster	Option C SAV	Option D No Preservation	Option A Marsh	Option B Oyster	Option C SAV	Option D No Preservation
#1	4	1	3	1	5	0	3	1
#2	1	1	3	3	5	1	1	2
Sum	**5**	**2**	**6**	**4**	**10**	**1**	**1**	**2**

Rockville #2 Preservation Program Question 2: The second question was designed to require participants to reveal preferences about a combination of habitat types. For all eighteen participants, Option A was an even distribution alternative: sediment, marsh, oyster reef, and SAV would have 25 acres preserved. Options B and C differed between focus groups. For the first focus group, Option B included preservation of 50 acres each of marsh and oyster reef. Option C entailed preservation of 50 acres each of marsh and SAV. This series of alternatives was designed, for those that selected marsh in the first question, to reveal whether oyster reef or SAV was their second most preferred habitat. Option D was again the status quo, no preservation alternative.

Table 4.16 presents the results of the second choice-based question and Table 4.17 contains the summary. In the first handout, seven participants selected the even distribution Option A. One each selected the marsh-SAV and marsh-oyster reef combinations. Comparing these results to those from the second choice-based handout, it is evident that information learned during the session influenced the participants' preference formation. Six of the nine participants changed their answers. During the second choice-based handout, four participants each selected the even distribution Option A and the marsh-SAV combination Option C. Interestingly, the one individual that originally selected Option C switched to Option A, and three participants that originally selected Option A switched to Option C.

Table 4.16 Rockville #2 focus group question two results.

Name	Gender	FG	Option A* S-M-O-V-$	Option B* S-M-O-V-$	Option C* S-M-O-V-$	Option D* S-M-O-V-$	Choice 1	Choice 2
K	F	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	C	*A*
J	M	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	A	*C*
M	F	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	A	*C*
T	M	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	A	A
J	F	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	A	A
A	F	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	A	*B*
G	M	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	B	*C*
S	M	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	A	*C*
SR	M	1	25-25-25-25-$20	0-50-50-0-$20	0-50-0-50-$20	0-0-0-0-$0	A	A
D	M	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	B	B
P	F	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	B	*A*
S	F	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	D	*B*
C	M	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	D	*A*
B	M	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	D	D
M	F	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	A	A
P	M	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	A	A
N	F	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	A	*C*
D	F	2	25-25-25-25-$50	0-50-0-50-$50	0-0-50-50-$50	0-0-0-0-$0	A	A

* The numbers presented in the option columns indicate the amount of habitat that would be preserved and the cost of preservation. The numbers are presented as sediment-marsh-oyster reef-SAV-cost (habitat amounts in acres).

Table 4.17 Rockville #2 focus group question two summary.

Focus Group	Number of Participants that Selected:							
	Choice Occasion #1				Choice Occasion #2			
	Option A Even	Option B	Option C	Option D No Preservation	Option A Even	Option B	Option C	Option D No Preservation
#1	7	1	1	0	4	1	4	0
#2	4	2	0	3	5	2	1	1

The second group of participants experienced a similar level of preference reevaluation. Initially, four participants selected the even distribution option, two the marsh-SAV combination, and three the no preservation scenario. After the habitat service handout, four respondents changed their answers. Five participants selected the even distribution option, two chose the marsh-SAV option, one opted for the oyster reef-SAV alternative, and one selected the no preservation program.

When examining the two focus groups together, nine of the eighteen participants selected the even distribution option, and another six chose the marsh-SAV combination during the second choice occasion. These results are consistent with both previous focus groups (a preference for the even distribution option) and the first question (a preference for marsh and SAV). Only one individual selected the status quo option. This individual was in the second focus group and had a choice between the status quo and three $50 alternatives. Perhaps most significant to the design and evaluation of the survey instrument, ten of the participants changed their answer to this question based on information learned during the session.

Rockville #2 Preservation Program Question 3: The third question was more complex. The alternatives for the first focus group focused on marsh preservation, while those for the second focused on SAV preservation. The research team selected these alternatives because they were thought to be the two most likely to be preferred by participants based on the Rockville #1, Virginia Beach, and Wilmington focus groups. The results from the first two questions suggest this was a valid supposition.

For the first focus group, Option A included 100 acres of marsh preservation. Option B was 50 acres each of marsh and oyster reef preservation. Option C was 40 acres of marsh, 30 acres of SAV, and 30 acres of oyster reef. Thus participants could choose to allocate all preservation to their most preferred habitat, split it between two habitats, or spread it in a quasi-even fashion. Option D was again the status quo, no preservation alternative. Initially, seven participants selected the quasi-even distribution. One preferred all marsh and one preferred no preservation. Both of these individuals changed their responses after the habitat service handout. The respondent that originally selected 100 acres of marsh preservation changed to the even split between marsh and oyster reef, and the participant that selected no preservation moved to the quasi-even distribution. No

individual that initially selected the quasi-even distribution changed his or her answer. These results are included in Table 4.18 and is summarized in Table 4.19.

Table 4.18 Rockville #2 focus group question three results.

Name	Gender	FG	Option A*	Option B*	Option C*	Option D*	Choice 1	Choice 2
K	F	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	C	C
J	M	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	C	C
M	F	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	C	C
T	M	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	C	C
J	F	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	C	C
A	F	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	A	*B*
G	M	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	C	C
S	M	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	C	C
SR	M	1	0-100-0-0-$20	0-50-50-0-$20	0-40-30-30-$20	0-0-0-0-$0	D	*C*
D	M	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	A	A
P	F	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	C	C
S	F	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	D	*C*
C	M	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	D	D
B	M	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	D	D
M	F	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	C	C
P	M	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	C	C
N	F	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	C	C
D	F	2	0-0-0-100-$50	0-0-50-50-$50	0-30-30-40-$50	0-0-0-0-$0	C	C

* The numbers presented in the option columns indicate the amount of habitat that would be preserved and the cost of preservation. The numbers are presented as sediment-marsh-oyster reef-SAV-cost (habitat amounts in acres).

Table 4.19 Rockville #2 focus group question three summary.

Focus Group	Number of Participants that Selected:							
	Choice Occasion #1				Choice Occasion #2			
	Option A	Option B	Option C	Option D No Preservation	Option A	Option B	Option C	Option D No Preservation
#1	1	0	7	1	0	1	8	0
#2	1	0	5	3	1	0	6	2

The second focus group received a question based on SAV restoration. Option A was 100 acres of SAV restoration, Option B was 50 acres of SAV and oyster reef, and Option C was 40 acres of SAV and 30 acres each of oyster and marsh. Initially, five participants selected the quasi-even distribution, one selected the all-SAV alternative, and three choose the status quo. After reviewing the habitat services handout, one of those selecting the status quo changed to the quasi-even distribution. No other changes were made.

It is clear that from this question that the quasi-even distribution is the dominant alternative. Fourteen of the eighteen participants selected this option during the second choice occasion. In addition, it appears that the habitat service handout had little influence on the selection of this option as only three participants changed their answers.

In collectively examining the results from these choice-based questions, it appears that the Rockville #2 focus group participants preferred either an even/quasi-even distribution or marsh preservation. There was a preference for SAV protection expressed, though less strongly than for even/quasi-even or marsh. Importantly, the focus group process illustrated that providing information about the habitats and their services is key to participants defining their preferences. Of the 54 choices made, participants changed their responses 19 times (35 percent). Fifteen of the eighteen participants changed answers for at least one question. However, none of the participants that chose the quasi-even distribution Option C in question 3 changed his or her response.

This last observation is an important one. Although some participants that initially chose the balanced option in the second question changed their response after they were given information, the balanced option in the second question included sediment. The more balanced option in the third question did not include sediment. As sediment is a less desirable habitat, according to participants in the Rockville #1, Virginia Beach, and Wilmington focus groups, this may be evidence of the fact that people prefer that all of the dominant habitats be preserved, and additional information does not matter. However, additional information about sediments swayed several participants to change their responses away from the balanced option in the second question; i.e. additional information does matter for certain habitats. It may also be possible that although people want all of their preferred habitats to be preserved at some level, they still want more of their favorite habitat to be preserved; evidence of this can be found in the results of question one from the Wilmington focus groups.

As with the other focus groups, valuable information was gained from participants through discussion of the handouts. In addition to suggestions put forward at the previous focus groups, Rockville #2 participants suggested that their selections would be influenced by the proximity of the preservation project to their homes and the method of preservation (how it would be purchased, monitored, enforced, and maintained). Interestingly, when asked if participants' decisions would be easier with a "scientist's opinion", many said they would not place much weight in such information. One participant noted that scientists are not always neutral in their assessments and another said that the scientists' priorities may not match their own. This runs counter to the desire for scientific recommendations voiced in previous focus groups.

Rockville #2 Summary: Marsh protection appears to provide the greatest utility; however, most respondents selected an alternative that included other habitats to a lesser degree. Importantly, the process used in the Rockville #2 focus groups clearly illustrates that the information concerning the habitat services in the handouts has a large influence on preference definition. This suggests that potential respondents are capable of generating defined preferences for various combinations of habitats.

5. LESSONS LEARNED

Information learned from the eight focus groups can be separated into two categories. First, the project team gained valuable insight into participants' decision-making processes. This information is necessary to design choice-based scenarios that reveal meaningful information about future survey respondents' preferences. Specifically, focus group participants' revealed a preference to restore the habitat that was subject to the damage or loss, and a lack of understanding of some of the habitat types. Second, the focus groups permitted the testing of several variants of a potential survey instrument and allowed for the identification of survey design issues. These topics will be discussed separately.

5.1 Affinity for Lost Habitat Type/Undefined Preferences

In the Rockville #1, Virginia Beach, and Wilmington focus groups, the participants were posed a choice-based scenario that involved some habitat loss. Through both their written responses and in discussion of their decision-making processes, participants expressed a strong desire to replace or restore the same habitat types that were lost. In the absence of a specific loss or for general preservation choice-based scenarios that did not entail a loss, participants expressed a strong desire to replace or protect all available habitat types to some degree. This finding was mildly surprising. In an ideal abstraction, the rational consumer is assumed to have perfectly defined preferences that dictate either a single preferred habitat type or a defined preferred combination of habitat types (a set ratio of habitat types). Ideally, these preferences are based on perfect knowledge of the various habitat types and the expert recall of past experiences with each habitat type. Given the ability to influence replacement or protected habitat types, it could be assumed that participants would offer their most preferred habitat type or their preferred combination of habitat types. That some participants prefer to replace what was lost, rather than their preferred habitats, violates this assumption.

The participants' general desire for in-kind replacement or preservation of all habitat types can be explained in one of three ways. First, participants have perfectly defined preferences across habitat types and those perfectly defined preferences result in an equal, or near equal, preference for each habitat type. Thus, the stated desire for in-kind replacement or even/near-even preservation is a logical outcome. Second, participants do not have defined preferences and are not given sufficient information to form defined preferences. In the absence of defined preferences, participants express a desire for in-kind replacement or even/near-even preservation as a way to hedge against choosing a single, unknown but least desired habitat type. This behavior conforms to the generally accepted tenant that most individuals are risk-averse. The expression of preferences can be influenced by providing additional necessary information to permit the definition of preferences. This outcome is logical. Third, participants are incapable of forming defined preferences between habitat types, regardless of the amount of information provided. Obviously, participants are unable to express preferences that are not and cannot be defined. In this situation, the "preferences" expressed in the answers to the

stated preference questions are irrational and arbitrary; they provide no information to the researcher about true underlying preferences because the respondent cannot form the preferences being investigated.

The first potential scenario is very unlikely. Given the different quality and quantity of services provided by the various habitats, it is unlikely that individuals would form identical levels of affinity for each. The second scenario is possible. If it is determined that this scenario accurately describes the decision-making processes of most focus group participants, development of informative, but simple and concise, habitat service descriptions would be imperative to elicit true preferences. The final scenario is also possible. If participants cannot be provided sufficient information to allow the formation and expression of defined preferences, any selections made by the respondent would be suspect.

5.2 Lack of Knowledge Regarding Habitats

Many of the focus group participants admitted that they did not have previously determined preferences about the habitats presented. Most participants knew and understood little regarding the services and functions of each habitat, and relied heavily on the information presented in the choice-based scenarios. This was especially evident in the Rockville #2 focus groups where the choice-based questions were answered before and after reading the habitat service descriptions. This has several implications for the development of a final survey instrument. It is obvious from the focus groups that many members of the public would have to be educated through the instrument prior to forming opinions on habitat tradeoff ratios. Depending on the quantity of information required, the survey instrument could become lengthy and complex. It is often the case that such surveys would realize a decrease in response rates as compared to shorter, simpler instruments.

For these reasons, the information presented about the habitats must be as accurate and informative as possible, while still being concise and understandable to the general public. It must also allow participants to differentiate between similar services provided by different habitats by giving specifics as to type, level, and quality of service. Finally, the information must be carefully constructed and reviewed, as any inaccuracies or omissions may lead to survey bias.

5.3 Natural versus Created Habitat

It is important to note that it is very likely that the public has a bias for natural, rather than created, habitat. One variant of the choice based scenarios proposed in this project deals with created habitat, but no information was provided to participants on the relative success of created versus natural habitats in terms of biophysical functions. However, one focus group participant said he made his choices based on the habitat he thought would be most easily and aesthetically re-created, rather than on his habitat preferences. While his responses are valid, based on the fact that damage assessment projects often deal with

created habitat, participants may not have accurate or complete information regarding habitat creation to make their decisions in this manner.

5.4 Survey Design Issues

It has been recognized that inclusion of multiple choice-based scenarios that both include and exclude a monetizing attribute will lead to internal survey inconsistency. Choice-based scenarios that do not include a monetizing attribute allow for the derivation of relative preference expressions. For instance, this type of scenario may indicate that the public would require 8 acres of SAV or 5 acres of oyster reef for every acre of marsh lost. The derived ratios are relative because they necessitate a comparison between habitat types to be of value to the researcher. Conversely, choice-based scenarios that include a monetizing attribute are absolute. For instance, this type of scenario may indicate that the public has a marginal willingness to pay of $151 for an acre of marsh, $104 for SAV, and $89 for oyster reef. Thus, the derived value for a habitat type is meaningful without reference or comparison to the other habitat types. It is very unlikely that the ratios derived from these two types of questions will be identical. Inclusion of both types in a single survey would lead to internal inconsistency: two different sets of ratios will be derived for a near-identical preference expression. Note that the preference expressions are not identical, only near-identical. The arguments that enter an individual's decision-making process for the non-monetized scenario include information provided in the survey instrument about the habitat types (including their abundance, distribution, and relative service provision), their personal experience with each of the habitat types, and a host of other, unknown arguments. The preferences expressed in the monetized scenario are derived from the same set of arguments, plus one added argument: the cost of the program. The degree to which the ratios derived by the monetized and non-monetized scenarios differ is based solely on the weight placed on the monetizing argument by the respondent.

The second survey design issue relates to payment vehicle and strategic biases, which may be present in the survey instruments used during the focus groups. For habitat restoration or preservation programs, the most logical and realistic source of revenue is a tax. It is unlikely that a believable scenario could be created that uses an alternate source of revenue. Use of a tax as the monetizing attribute opens the possibility that protest bids may be provided by respondents. Protest bids occur when respondents select the alternative with a $0 payment because they believe they already pay enough in taxes. Thus, their selection of the $0 alternative is not an expression of their true willingness to pay for the program, but a referendum vote on the general level of taxes. While the research team is unaware of any ways to reduce or eliminate protest bids, additional questions in the survey instrument can assist with differentiating true $0 expressions of willingness to pay from protest bids. That having been recognized, the use of a one-time increase or surcharge on property taxes has been used in the focus groups. One obvious potential problem is that not all respondents directly pay property taxes. Renters may pay property tax through the landowner, however, the efficiency of completely transferring a one-time increase in property tax from the landowner to the renter is suspect. If individuals perceive that they can derive benefits from the restoration or preservation

program without having to pay the proposed tax, strategic bias may be introduced into the scenario. If this were the case, renters and others that do not pay property tax directly would have an incentive to overstate their true willingness to pay for the program. In essence, they would attempt to become free riders on the provision of environmental services. This issue was addressed during the Wilmington and Rockville #2 focus groups. The participants were asked if they were renters, and, if so, how the fact that they did not directly pay property taxes entered into their decision-making process. All renters responded that it did not occur to them; most respondents related the one-time increase in property taxes to a general, unspecified increase in their tax payments. This issue may be investigated further, but results thus far indicate that strategic bias may not be a large problem with the scenario.

Any stated preference survey must be carefully designed to minimize starting point bias. Starting point bias arises when individuals do not have absolute, pre-determined preferences for an unfamiliar program. In these situations, respondents may take clues as to what their willingness to pay should be from the scenario's offer price. Results from the Wilmington focus groups indicate that starting point bias may be present in the survey. The monetized choice-based scenarios were very similar between the two focus group sessions. The first session was presented a program with a $20 payment, and the second session had a $50 payment. An open-ended follow-up question asked the participants for their maximum willingness to pay. In both sessions, many participants responded by doubling the offer price: the first focus session responded with $40 or $50 maximums while the second session responded with $100 maximums (see Table 4.12). This form of bias can be minimized with several survey design and administration techniques. Its presence in small focus groups sessions is not exceptionally surprising.

The validity of stated preference surveys could be questioned if two programs to address the same resource cover a vastly different area or quantity, but the willingness to pay results are nearly identical. For instance, it is logical that respondents would be willing to pay more for the preservation of one million acres of prime habitat than they would be willing to pay for the preservation of ten acres. The term embedding is derived from the concept that the smaller program is embedded in the larger one, and hence the willingness to pay for the larger program should be larger than that of the smaller. This is an issue that is gaining wider attention, and would have to be investigated through additional focus groups, one-on-one interviews, and final survey sub-sampling.

It is also possible that the survey instrument may not be sufficiently neutral in its presentation of information. Several participants noted that the habitat descriptions contained only beneficial aspects, and that there was no discussion of negative services provided (such as foul odors, insects, or flood channels).

In addition some participants noted that the choice-based scenarios included several long blocks of text. They suggested that the necessary information be presented in a more concise, bulleted form. This suggestion can be balanced with the desire for more information on both the habitat and choice-based descriptions that other participants said they required.

Finally, many participants said that the information given about the various habitats and their services was sufficient to make decisions in the choice scenarios, which is encouraging for the development of a final survey instrument. They said that other contextual factors, such as the amount of each habitat available in the region, the amount lost in recent years, and the location of the project would heavily impact their decisions. While the survey can be designed to give respondents context, it needs to do so in a manner that minimizes the influence of context on participant choices, perhaps by holding the information as constant as possible across all habitats while not being fabricated. If it does not, participants' choices will be invalid. For example, if most people choose marsh over sediments, and the scenario explains that sediment is more prevalent than marsh, it is unknown whether respondents truly prefer marsh, or if they are choosing the scarcer habitat. However, to say that just as much marsh exists in the region as sediment is obviously untrue. Therefore, the scenarios constructed should minimize the need for such contextual information.

6. NEXT STEPS

Following the eight focus groups, the research team decided that despite its limitations, the information to be potentially gleaned from the continuation of the cross-habitat study would be useful in the resource management and damage assessment context. The authors have moved forward on this project by creating a survey instrument that is almost ready to be pretested (see Appendix IV).

This survey instrument is different from the focus groups handouts. First, it does not ask respondents to rank habitat services, only to choose among habitats themselves. Habitat service rankings in the focus groups simply allowed the authors to determine the effectiveness of the habitat descriptions. Although it would be interesting to determine which services people prefer, it is not practical for the damage assessment context in which entire habitats are restored, rather than just their critical services. Although it is clear that reading the information about the habitats can change a respondent's selection, and it could be argued that people should be asked to rank the habitats given their current level of knowledge, it was decided that the habitat descriptions should remain.

Second, the authors decided to narrow the scope of the study to best obtain functional data. The overarching goals of the survey will be to obtain tradeoff ratios among the preferred habitats (marsh, SAV and oyster reef, depending on the region in which the survey is implemented), as well as a tradeoff ratio between natural sediment and created marsh habitat. This information will be most useful in the damage assessment context. The survey is designed to achieve these goals. If desired for other purposes, a monetization component of the study could be added, building on the results of the focus groups reported here. Ratios derived by non-monetized and monetized scenarios might produce different ratios, however.

Third, the choice scenario will aim to be as specific as possible in terms of contextual information regarding habitats in the chosen region, as well as the site of the project, as this information seemed to greatly affect respondents' choices as well as the decision framework they use to make those choices.

The hope is that the tradeoff ratios provided by the study will closely mirror the scientific ratios currently used in damage assessment. However, if they do not, the environmental managers will need to determine how best to incorporate this new information into injury scaling.

APPENDIX I:
FOCUS GROUP BACKGROUND INFORMATION FORM

Background Information

QB1. How often do you personally participate in each of the following? (Circle the letter of your answer for each activity)

	Less than once a year	1 to 5 times a year	6 to 10 times a year	More than 10 times a year
Fishing……	A	B	C	D
Boating (non-fishing)…….	A	B	C	D
Water-skiing or jet skiing…..	A	B	C	D
Swimming……	A	B	C	D
Snorkeling……	A	B	C	D
Wildlife viewing…….	A	B	C	D
Hiking…….	A	B	C	D
Surfing…….	A	B	C	D
Scuba diving……	A	B	C	D
Other (_____)	A	B	C	D

QB2. Do you belong to any environmental organizations? If yes, which one(s)?

QB3. In the focus group we will discuss issues concerning various habitats. Habitats are areas of land or water that provide specific living and nonliving factors or conditions necessary to support plant and animal communities. Please list several habitats with which you are familiar and/or have visited.

QB4. Do you own or rent your home?

APPENDIX II:
ORAL FOCUS GROUP INSTRUCTIONS

Good evening everyone and thank you for coming. I asked you to be here today on behalf of a group that's doing some research on how people feel about various environmental issues. I will give you more specific details in a moment, but the main point of this focus group is to solicit your input on each topic I mention. Over the next two hours or so, I will ask you about your ideas and opinions on a variety of related topics. There is no wrong answer; I just want to hear what's on your mind. There is bound to be some difference of opinion between the people in the room, and that's fine. I want to hear everyone's opinion and what you think of the specific issue.

We will only be using first names here today, and nothing said in this room will be repeated except for research purposes. Any remarks that are used in further research, or in any reports written about this meeting will not use first names, but simply state, "one person said," or "some people said." You will also be asked to respond to certain questions in writing. These answers will also not be associated specifically with you. Please write only your first names on these handouts as well.

I want to lay out some ground rules before we begin. I am taping this session as my way of keeping notes. Again, anything used from the tape later will not be associated with you. Additionally, there are several observers behind the mirror; they will be taking notes as well.

Because we are taping this, it is important that only one person speak at a time. However, I would like to hear from everyone. If one person has not volunteered anything on a particular topic, I may ask them directly to address it. Additionally, if someone else has said a lot on a given topic, I may ask someone else his or her opinion. Please don't be offended; I'm just trying to get as much varied information as possible.

There may be times when our discussion veers away from the topic at hand and an interesting conversation develops. I may have to cut that discussion short and steer our focus back to the topic at hand. Again, don't be offended; I'm just trying to get through all of the material.

Finally, later on in the discussion, I will be presenting some technical information. If anything is unclear to you, or you'd like me to repeat, clarify, or explain something, please do not hesitate to ask. We're going to be talking today about some issues specific to this area.

Please help yourself to the refreshments on the table and feel free to excuse yourself if you need to use the restroom.

First, let's go around the table and have everyone introduce him or herself, where they live, and something interesting about themselves.

APPENDIX III:
HABITAT SERVICE HANDOUT EXAMPLE

This handout is an example of the kind of questions focus group participants were asked about various habitats and the services they provide. This particular example was used for the Rockville #2 focus groups for the marsh habitat.

HANDOUT #3
Services Provided by Estuarine Marshes

Estuaries are places where rivers meet the sea. This results in the mixing of fresh water with salt water so the water isn't as salty as the ocean or as fresh as the river.

Estuarine marsh is a type of wetland that occurs in an estuary and is characterized by a complex system of plants and channels that tend to be wet or regularly flooded. Estuarine marsh plants are adapted to live in waterlogged soil conditions and are tolerant of flooding from both fresh and salt water.

Estuarine marshes also provide a variety of ecological and recreational services. Some of these services are described below.

- Primary production – The plants that are present in an estuarine marsh use the energy from the sun to grow. Insects, birds, and other animals eat the plants. When the plants die or shed leaves, this plant material decomposes and animals (such as marine worms, crabs, and many others) eat the decaying plants.

- Improved water quality - Estuarine marshes improve water quality for plants and animals by slowing down water flow, allowing sediments to settle out of the water, and by absorbing and filtering out excess nutrients in the water. This water quality improvement has no impact on drinking water because communities do not use estuarine marshes as a drinking water supply.

- Habitat for animals – Because estuarine marshes are both above and below the water, they provide a critical area for both land-based and water-based animals, including: birds, mammals, insects, reptiles, fish, crustaceans (such as crabs and shrimp), and other marine invertebrates (snails, worms, etc.). These animals may use the marsh to live, feed, and reproduce at different times during their life.

- Habitat for commercial harvest - Estuarine marshes provide habitat for fish and wildlife that can be harvested for commercial use.

- Recreational opportunities - Estuarine marshes provide open space and create recreational opportunities such as fishing, hiking, canoeing, and wildlife viewing.

QM1. Think about each of the services described above. Please rate how important you consider each service **TO YOU** (place a check in the box that best represents your view).

Estuarine marshes provide….	Very Important	Somewhat Important	Not Important at All
Primary Production	❒	❒	❒
Improved water quality	❒	❒	❒
Habitat for animals	❒	❒	❒
Habitat for commercial harvest	❒	❒	❒
Recreational opportunities	❒	❒	❒

QM2. Please rank each of the services of estuarine marshes in order of importance **TO YOU**, with a "1" representing the most important service and a "5" representing the least important. Please **DO NOT** assign the same number to more than one service.

	Rank
• Primary production	_____
• Improved water quality	_____
• Habitat for animals	_____
• Habitat for commercial harvest	_____
• Open space and recreational opportunities	_____

APPENDIX IV:
PARTIAL SURVEY INSTRUMENT FOR PRETEST

This is a draft of the survey instrument that will be pretested by the research team

Question A: Revitalization Project, No Sediment Restoration

Resource managers are interested in public attitudes toward environmental issues. Suppose you are part of a citizen panel providing input to state government on coastal management (such panels are commonly formed to solicit public opinion on various issues).

There will be a new public revitalization project in a coastal county in your state. This will be a joint project of both the state and county governments. Part of the project will involve "reclaiming" land from the adjacent waterway. This will be done by filling a portion of the waterway next to the current shoreline with soil, creating land out of what is currently water. By doing this, about **100 acres of sediment** and the services they provide will be lost in the waterway. Unfortunately, creating areas of sediment elsewhere to compensate for this sediment loss is not practical in this instance. The state and county governments are planning to compensate for this sediment loss by creating estuarine marshes, oyster reef, or submerged aquatic vegetation (SAV) beds. As a member of the citizen panel, you are being asked to review three potential compensatory projects and answer the questions below.

	If Project 1 is selected, the following habitat gains are expected:	If Project 2 is selected, the following habitat gains are expected:	If Project 3 is selected, the following habitat gains are expected:
Sediment Gain	**0 acres**	**0 acres**	**0 acres**
Estuarine Marsh Gain	**10 acres**	**0 acres**	**0 acres**
Oyster Reef Gain	**0 acres**	**15 acres**	**0 acres**
Submerged Aquatic Vegetation Gain	**0 acres**	**0 acres**	**20 acres**

It is important to note that the new revitalization development has already been approved and will occur. However, the compensatory project has not been selected. Given the three projects above, which projects do you prefer? (Check one box)

Project 1	Project 2	Project 3
☐	☐	☐

Question B: Contamination, No Sediment Restoration

Resource managers are interested in public attitudes toward environmental issues. Suppose you are part of a citizen panel providing input to state government on coastal management (such panels are commonly formed to solicit public opinion on various issues).

The federal and state governments are responsible for ensuring that companies adhere to environmental laws. A coastal county in your state has experienced long-term water pollution from certain industries, in violation of environmental laws. The pollution contaminated about **100 acres of sediment**. Because of government action, these companies have changed their practices and are no longer polluting the water, but the pollution greatly reduced the services being provided by the sediment. While the government has forced the companies to use the best available technology to cleanup the contamination, full sediment services will not be restored for at least 10 years. In addition to the cleanup, the federal and state governments levied and collected a large fine from the companies for violating the environmental laws. The governments have collected enough in fines to implement **one of the following projects**. As a member of the citizen panel, you are being asked to review three potential compensatory projects. Please keep in mind the information about habitat services that you read earlier, and answer the following questions.

	If Project 1 is selected, the following habitat gains are expected:	If Project 2 is selected, the following habitat gains are expected:	If Project 3 is selected, the following habitat gains are expected:
Sediment Gain	**0 acres**	**0 acres**	**0 acres**
Estuarine Marsh Gain	**10 acres**	**0 acres**	**0 acres**
Oyster Reef Gain	**0 acres**	**15 acres**	**0 acres**
Submerged Aquatic Vegetation Gain	**0 acres**	**0 acres**	**20 acres**

The government and companies have done all they can do to remove the contamination, however it will take time for sediment services to be restored. Given the three projects above, which project do you prefer as compensation for the lost sediment services? (Check one box)

Project 1	Project 2	Project 3
☐	☐	☐

Question C: Contamination, Sediment Restoration Possible

Resource managers are interested in public attitudes toward environmental issues. Suppose you are part of a citizen panel providing input to state government on coastal management (such panels are commonly formed to solicit public opinion on various issues).

The federal and state governments are responsible for ensuring that companies adhere to environmental laws. A coastal county in your state has experienced long-term water pollution from certain industries, in violation of environmental laws. The pollution contaminated about **100 acres of sediment**. Because of government action, these companies have changed their practices and are no longer polluting the water, but the pollution greatly reduced the services being provided by the sediment. The federal and state governments levied and collected a large fine from the companies for violating the environmental laws.

The governments have two options for using this money: spend it all to clean the sediment or spend it all to create estuarine marsh in the coastal county. Scientists predict that if the area sediments are cleaned, full sediment services will be restored in **5 years**. Without the sediment cleanup, the contamination will be slowly and naturally buried over time and full sediment services will be restored in about **50 years**. If the government chooses to build estuarine marsh instead, a total of **30 acres** can be created. Since the government does not have additional funds, if the money collected from the companies is used for sediment cleanup, the marsh will not be created. As a member of the citizen panel, you are being asked to provide your opinion on these two alternatives. Please keep in mind the information about habitat services that you read earlier, and answer the following questions.

Alternative A **Clean Sediment:**	**Alternative B** **Create Estuarine Marsh:**
● Spend all money to clean 100 acres of sediment.	**● Spend no money to clean sediment.**
● Sediment services will be restored in 5 years.	**● Sediment services will be restored naturally in 50 years.**
● No estuarine marsh will be created.	**● 30 acres of estuarine marsh will be created,**

The government only has the money to implement one of these alternatives. Thinking about the habitat services described earlier, which project would you like the government to implement? (Check one box)

Alternative A	**Alternative B**
□	□